ENGINEERING NEWS-RECORD

MARCH 24, 1960

1st Quarterly Cost Roundup

PRICE 50 CENTS

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BUILDING COSTS REPORT AND OUTLOOK p. 81

A McGraw-Hill Publication

TOWERS OF STRENGTH
Thanks To Concrete

The $90 million Throgs Neck Bridge, a two-mile-long, six-lane span over New York's East River, will serve as a vitally needed link in the Interstate Highway System when it is completed early in 1961. The bridge and its approaches are rising on foundations, anchorages and piers of concrete. Penn-Dixie cement has been used for this great project by the contractors listed below.

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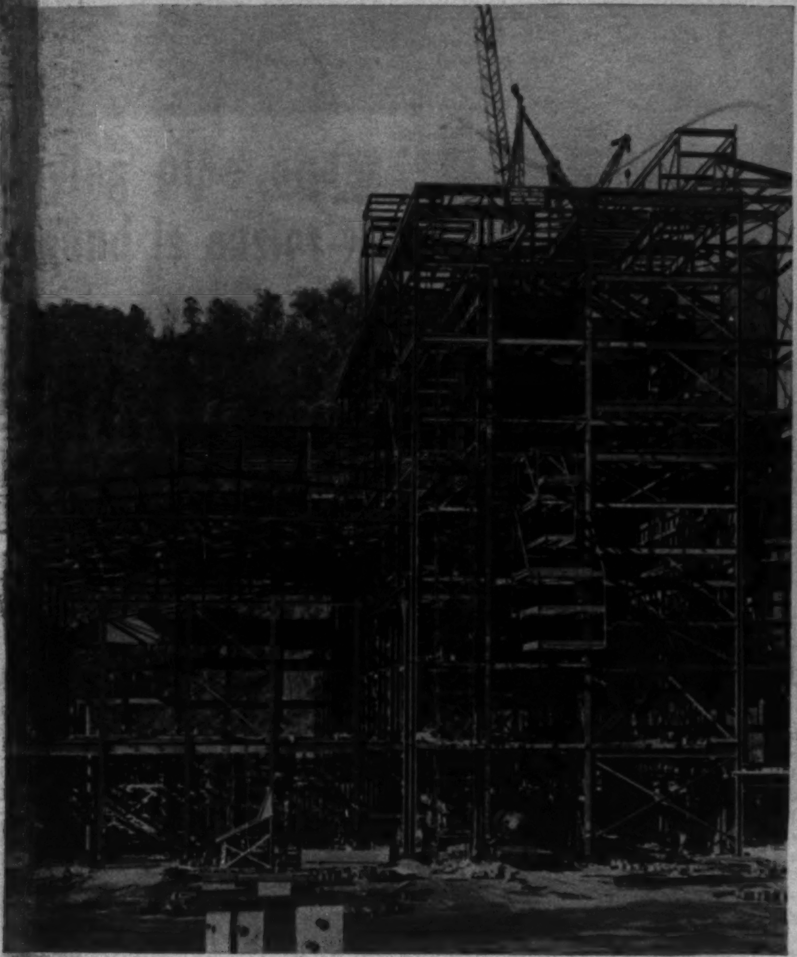
You can't see the forest for the steel

There's plenty of it in this Clinch River Plant of Appalachian Power Company. 7,460 tons of Bethlehem Shapes and Plates, to be exact. And it's all held together by 60 tons of Bethlehem Rivets and High-Strength Bolts.



◄ **7,460 TONS OF STEEL STRONG,** this Clinch River Plant was designed and engineered by American Electric Power Service Corp. Bethlehem structural steel was fabricated and erected by Bristol Steel & Iron Works, Inc.

▲ **HIGH-STRENGTH BOLTS** go in fast. They hold tight, stay tight. Bethlehem supplies a full-size range to meet every construction need.

Located on a 105-acre site near Carbo, Virginia, this 60-million plant has two 225,000-kilowatt turbine-generators which can provide electric service to 650,000 average homes. Three 138,000-volt transmission lines link the plant to Appalachian's far-reaching transmission system, and to the remainder of the seven-state American Electric Power System.

Plant construction began in mid-1956. By October 1, 1958, the plant was already operating. 7,460 tons of Bethlehem structural steel (shapes and plates), and 60 tons of Bethlehem rivets and high-strength bolts, went into the structure.

Whether you're building steam-generating stations or churches, highway bridges or shopping centers . . . our nearest sales office stands ready to give you full details. Give us a call today. Or write to us at Bethlehem, Pa.

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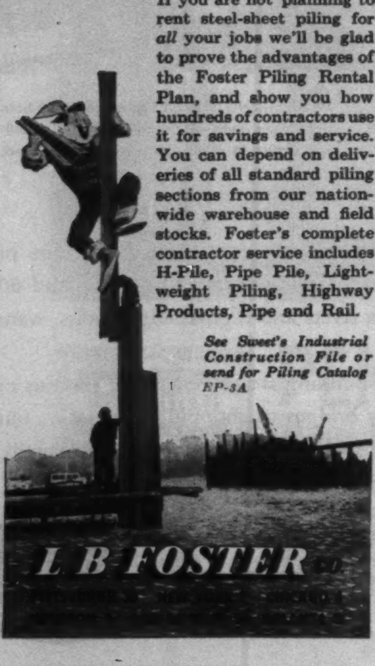

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PIPE: 36" Universal Vitrified Clay Pipe with pre-assembled Tylox Rubber Gaskets

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310 FOOT BOOM

P&H 110-ton Crawler Erecting Crane Tops Out 30 Story building with world's longest boom

Here's a construction "first" established by Chas. V. Castaldo Construction Corporation, Bronx, New York, in the erection of the new Imperial House apartment buildings in Manhattan.

With this P&H rig, they started with a 200′ boom for the first 15 floors. Using a 3 yd. concrete bucket, they averaged 60 cu. yds. per hour by handling a load every 3 minutes! . . . a pretty fast pace in the middle of Manhattan! All work motions being independent of each other really counted in producing the speed needed for this fast pour.

For the 16th to the 21st floors, 50′ more boom was added—total boom length—250′. For an average pour, let's take the 20th floor: 42 cu. yds. per hour with a 3 yd. bucket! This was possible because of Magnetorque® swings which speeded up the entire work cycle through faster, frictionless swings. (Even later at 310 feet up there was no "fly-rod" action and boom side stress was greatly reduced). The 1015 has no linings to replace . . . no adjustments or maintenance are necessary. Think of the time Castaldo saved on this one P&H feature alone!

They weren't through yet! A 50′ jib was the next addition for pouring from the 22nd to 29th floors—total now: 300′ boom. Here they handled 2 yds. of concrete with a typical output average of 37½ cu. yds. per hour.

Finally, to top out everything, another 10′ jib insert was added. It was used to pour at the 29th and 30th floors and penthouse . . . an unequalled 310′ of boom pouring 1½ yds. of concrete with an average output of 35 cu. yds. per hour.

Safety was a prime characteristic of the entire operation through the independent planetary boom hoist with single directional cam clutches which provided "triple-safe" operation.

Equally important to Castaldo's work is the mobility of this outstanding rig. The morning after the job was finished, the boom was dismantled and the machine loaded on trailers by 10:00 a.m., moved across town and set up with 250′ of boom ready for a new project by 5:00 p.m., the very same day.

Castaldo's many jobs also call on the ability of the 1015 to lift 110 tons with a basic 50′ boom, at a practical 15′ radius.

Between this 110-ton crawler erecting crane and the 12½ ton Heavy Duty Miti-Mite—regardless of your capacity needs—Harnischfeger has a crane to do your job faster and at a lower cost. For more information, just mail the coupon to Harnischfeger Corporation, Construction and Mining Division, Milwaukee 46, Wisconsin.

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P&H
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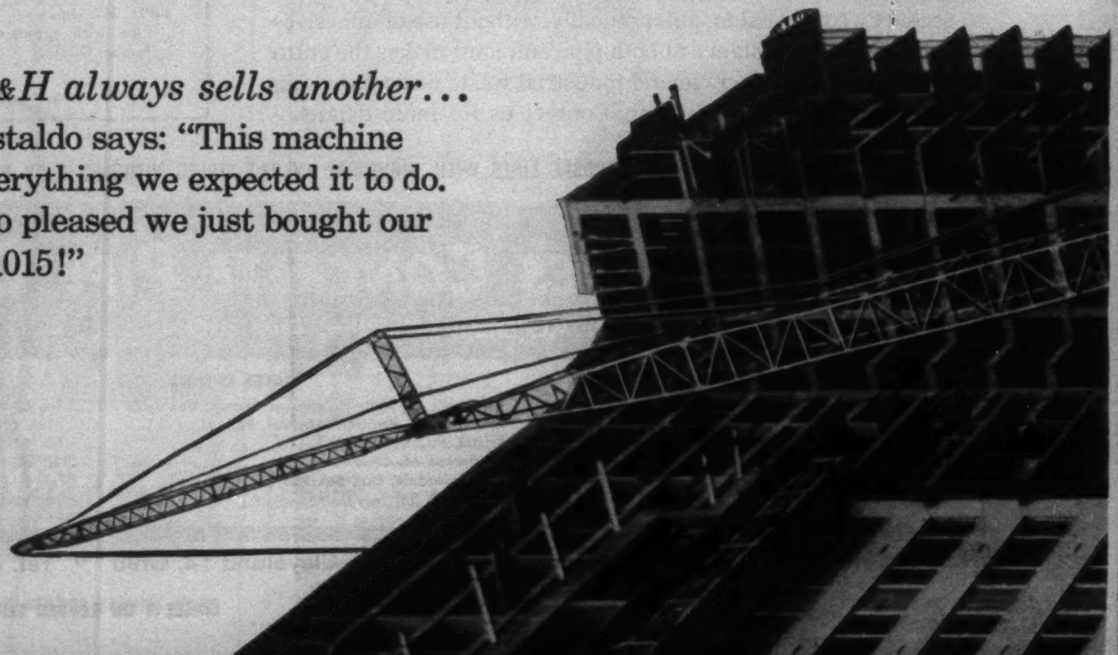
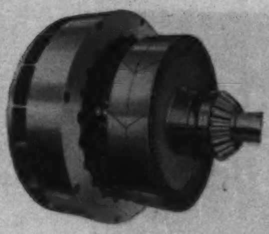
One P&H always sells another...

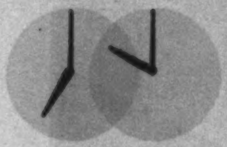
Mr. Castaldo says: "This machine does everything we expected it to do. We're so pleased we just bought our fourth 1015!"





THIS IS MAGNETORQUE

Precision control through Magnetorque swings eliminates whip on this job, reduces boom side stress—no linings to burn out or replace . . . gives better acceleration and deceleration for consistently better production.



3-HOUR TAKE-DOWN!

That's all Castaldo required—even with 250 feet of boom and 60 feet of jib. 3 hours after start, everything is down, trailer loaded, ready to move to the next job. Low, overall height (13 feet with gantry in folded position) simplified transporting and operation in restricted areas.

Harnischfeger Corporation, Construction & Mining Division,
4400 West National Avenue, Milwaukee 46, Wisconsin

☐ Would like a copy of the case history of this 110-ton P&H 1015 working on the Manhattan project.

☐ Send along literature, specifications and additional information on this 110-ton rig.

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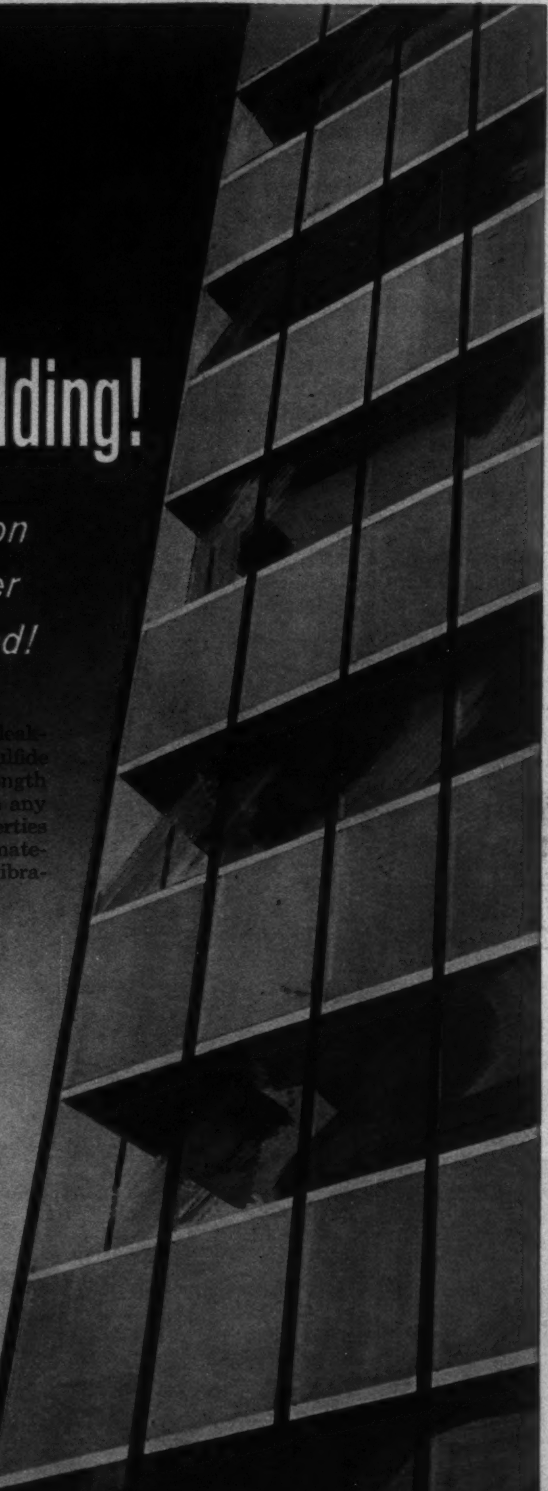
For more than a decade, sealants based on THIOKOL liquid polymers have answered industry's toughest sealing problems. For full information, write to THIOKOL at address below.



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CIRCLE 6 ON READER SERVICE CARD

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ULTRACOUSTIC® CEILING BOARD, the popular glass fiber board for suspended ceilings. Acoustical properties are excellent—and it's the only glass fiber board with *travertine* finish! Ask for a sample and Brochure UCB.

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Engineered for use in many areas of construction, the great versatility and handling ease of Sonoco Fibre Construction Products make possible savings in time, labor, materials, and money, while at the same time permitting new design and structural features.

Lightweight and easy to handle

Can be sawed to size on the job

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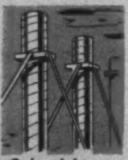

Only minimum bracing is required

Pour by normal method at normal rate

Stripping is easy and quick

Speed Construction of Round Concrete Columns with

SONOCO Sonotube® FIBRE FORMS

There's no lost motion and no waiting on forms when you use SONOTUBE Fibre Forms for round columns of concrete. In addition, these low-cost, versatile forms are easy to place, brace, pour and strip. So, whether the project is a bridge, building, or any other type of structure, you save forming time and job time, you save labor, and you save overall costs with SONOTUBE Fibre Forms—the fastest, most economical forming method for round columns of concrete.

There's a type to meet any job requirement:

1. "A" Coated (patented)—standard form for exposed columns—permits painting or plastering of stripped column.
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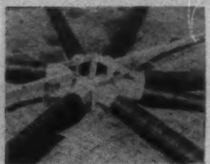
4. Encasement Form—To encase existing columns, piling, posts, and utility lines with concrete.
5. Special—Forms for use in water or excessively damp places are available on special order.

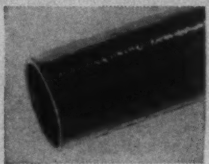
SONOTUBE Fibre Forms in sizes from 2" to 48" I.D., in specified lengths or standard 18' lengths.

Other SONOCO Fibre Construction products

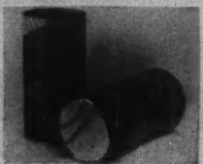
DUROPIPE Bituminized Fibre Pipe—regular or perforated



SONOAIRDUCT Fibre Duct for slab perimeter heating



P.I. PIPE—pitch-impregnated pipe in sizes to 36" I.D.



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These products are backed by over 60 years of Sonoco experience, and are subjected to rigid control and inspection throughout every step of manufacture. You are assured of uniformly high quality that meets the most exacting industry requirements.

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FORM VOIDS WITH ECONOMICAL

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FIBRE TUBES

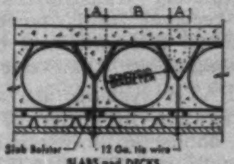
Voids formed with SONOVOID Fibre Tubes displace low-working concrete in floor and roof slabs, bridge decks, piles, and precast members. Weight is thus reduced, and a saving of concrete and steel accomplished without impairing structural strength.

In buildings and bridges, lightweight voided slabs permit longer spans, smaller structural members, and many additional reductions in overall costs.

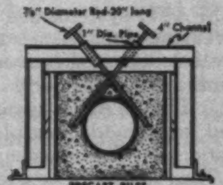
Also, voided precast units and piles save labor and materials, and require less costly handling and driving equipment.

Specifically designed to form voids in concrete construction, SONOCO SONOVOID Fibre Tubes are low in cost, easy to handle and place, and save contractors and owners time, labor, materials, and money. Order standard 18′ lengths or required lengths, in sizes from 2.25″ to 36.9″ O.D. Can be sawed—end closures available. Slab design tables on request.

Simple methods of Placing and Hold down to prevent flotation.



SLABS and DECKS



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CIRCLE 9 ON READER SERVICE CARD

THE SEISCOR TELEPATH

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Hard-hat with built-in radio, antenna, earphones and microphone.

BELT-CLIP MODEL

Radio unit; headset with antenna, earphones and microphone; shirt-clip controls.

OTHER MODELS

Air Force-Type for jet-engine noise.

A complete pocket-size 2-way radio.

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These short range systems use a completely transistorized transmitter-receiver unit, powered by economical self-contained batteries, and weigh less than one pound. TELEPATH systems are available for operation in either 27 mc. or 50 mc. bands. No license is required for the 27 mc. TELEPATH . . . it can be used immediately!

TELEPATH systems are a part of your wearing apparel, assuring you of more freedom and convenience of use than the old style "walkie-talkies." TELEPATH systems may be used to provide complete communication networks, either indoors or out. They also may be used directly with your present communications system, to extend its usefulness.

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- **Meets All Applicable FCC Requirements**
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Reader Comment

Time to Close Ranks

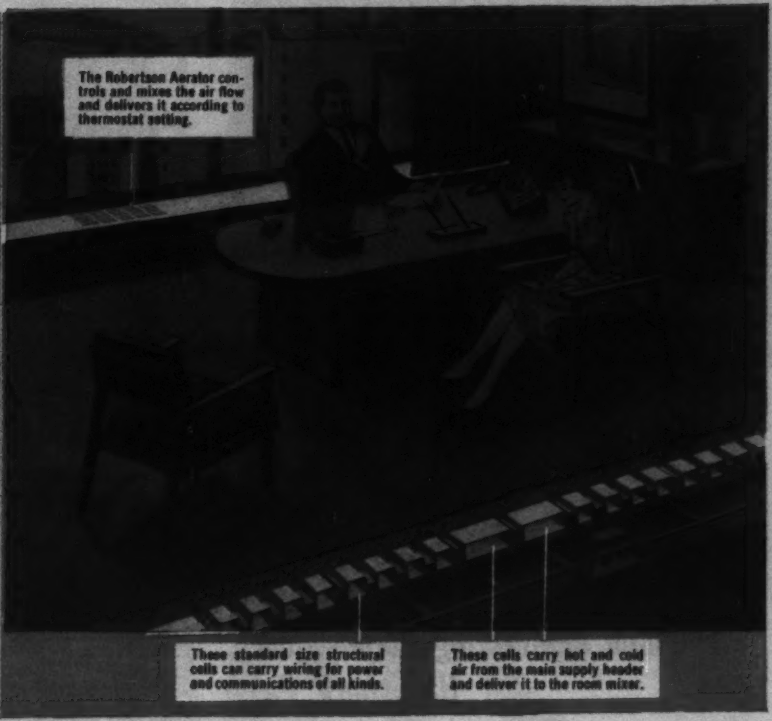
SIR—Recent Reader Comments on the subject of consulting vs. government employed engineers (ENR Dec. 10, 1959, p. 6; Jan. 28, p. 8) are undermining the prestige of the engineering profession.

There appears to be a current wave of hysteria associated with the discussions elaborating on the pros and cons of this and other subjects as follows:

- Recent letters from your readers in support of the practice of hiring consultants versus accomplishment by directly employed engineers have a very caustic tone. While there is merit to both sides of the argument, this is being beclouded by personal bias and prejudice. There is room for both methods, as there has been in the past, and there is no justification for carrying this controversy to extremes.
- Recently certain regulatory agencies of the government have advocated competitive bidding for engineering services, insisting that negotiated fees involve extravagance, etc. The personnel proposing such practice are usually bookkeepers, accountants, clerks and lawyers totally unqualified to pass on the merits of competitive vs negotiated procurement of engineering services. Bickering between engineers engaged in private practice and government service supports this argument.
- It is noted that in New Jersey, the architects are currently endeavoring through court action to prohibit engineers from designing structures. The case in point is a country club designed by an engineer. It must be admitted that an engineer is miscast in the capacity of designer for a monumental, ecclesiastical or social activity structure. On the other hand, an engineer is certainly qualified to design an industrial, utility or public works structure. Isn't the attempt to prohibit engineers from designing structures going entirely too far, just because a slight infraction to the usual practice was involved in this case?
- The National Society of Professional Engineers is doing an excellent job in protecting the status of the professional engineer and is deserving of much credit for the results that have been achieved through their efforts. If, however, NSPE persists in failing to acknowledge the jurisdiction of the Engi-

Engineering News-Record welcomes expression of opinions from its readers. Comment should be as brief as possible and pertinent to subjects of current construction importance. Letters should be addressed Editor, Engineering News-Record, 330 W. 42nd St., New York 36, N. Y.

Cut Capital And Annual Costs With



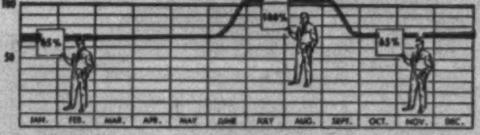
The Robertson Aerator controls and mixes the air flow and delivers it according to thermostat setting.

These standard size structural cells can carry wiring for power and communications of all kinds.

These cells carry hot and cold air from the main supply header and deliver it to the room mixer.

Robertson Q-Air Floor system

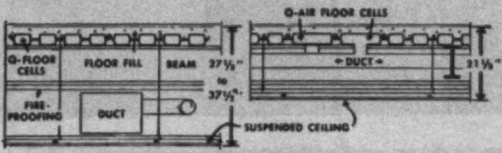
. . . increase air conditioning efficiency and save construction money



During the winter, Robertson Aerators satisfy heating requirements at 65% of peak volume.

For peak summer cooling, aerators deliver 100% volume and system runs at full power.

As cold weather approaches, changeover device adjusts system back to 65% of peak volume.



Simplified cross sections of ceiling-to-floor-above areas show old way left and Q-Air Floor right. Average compaction is one foot.

Basically, Q-Air Floor is an outgrowth of Robertson Q-Floor, the quarter-century-old cellular steel subflooring system which provides quick, efficient construction and continuous wiring raceways in more than 15,000 buildings. Within its own thickness, and without disturbing the 2-foot module of standard Q-Floor, the new system provides pairs of wide structural cells for use in connection with dual-duct, high-velocity air conditioning. These load-bearing cells are adapted by the air conditioning contractor to transport air from horizontal supply ducts to mixing units for discharge into the room.

The advantages of Q-Air Floor are threefold. The system includes the exclusive and patented Robertson Aerator, a mixing device with a seasonal changeover feature which keeps blower power at 65% of capacity except during peak summer load. Yearly power cost can be reduced as much as 30%. Since Q-Air Floor saves an average of a foot in depth per floor section, as much as 5% in building material cost can be saved—depending on the rise of the building. And this compaction inevitably results in up to an 11% reduction in overall BTU requirements.

Robertson
Q-AIR Floor
H. H. Robertson Company

2420 Farmers Bank Building, Pittsburgh 22, Pa.

In England—Robertson Thain Ltd., Ellesmere Port, Cheshire
In Canada—Robertson-Irwin Ltd., Hamilton, Ontario • Edmonton, Alberta

Use the coupon for further information about this revolutionary system—already in successful use in a number of splendid buildings.

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COMPANY____________________________________
ADDRESS____________________________________
CITY____________________________STATE____________

CIRCLE 11 ON READER SERVICE CARD

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CONTRACTING
CORPORATION

"Lubrication IN THE FIELD with the *Lincoln Lubrovan** helps us meet our production schedules"

says William P. Fulghum
vice president
Fulghum Contracting Corporation
Harrisburg, Pa.

"In our type of business," says Mr. Fulghum, "delays are costly, both to our profits and our reputation. We can't afford to have our equipment tied up too long for lubrication and servicing.

"By bringing lubrication *right to the job site* with our custom-designed Lincoln Lubrovan, we can operate with a minimum of downtime. Production schedules are easier to meet, and our equipment works better and lasts longer, because it's properly lubricated at all times."

Lincoln Lubrovans and Lubmobiles lubricate equipment IN THE FIELD — *reduce downtime — increase equipment life*

STANDARD OR CUSTOM-DESIGNED PORTABLE LUBRICATION PACKAGES contain all the needed equipment—air compressor, lubricant pumps, reel-and-hose assemblies, etc.— to keep your 'dozers, scrapers, and other machinery operating at maximum schedules, with as little downtime as necessary.

Whatever the size or type of *your* operation, Lincoln can provide a Lubrovan or Lubmobile to meet your needs exactly. Call the Lincoln representative in your area for complete information on this modern lubrication method, or write to us for Catalog No. 32 and Engineering Manual No. 33.

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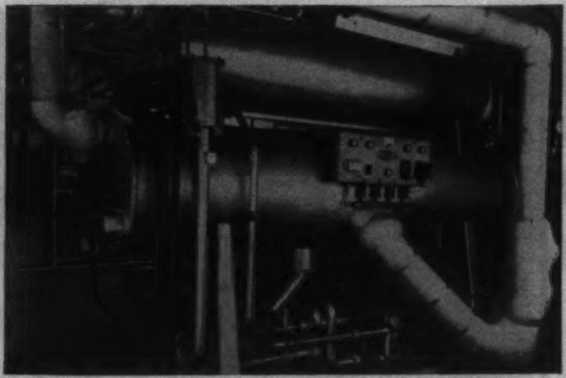
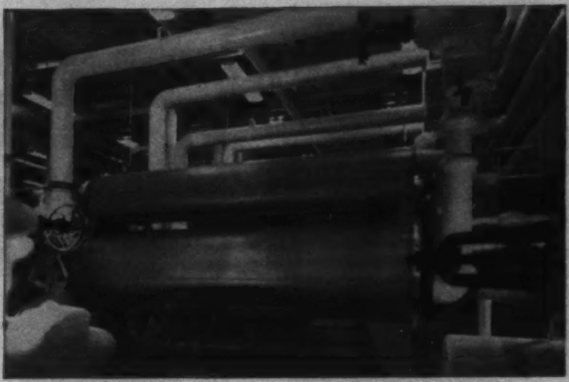


FOURTEEN YEARS AGO, the first Carrier Absorption Refrigeration Machine was installed in the Sealright Corporation's plant in Fulton, New York. This pioneer machine has been in continuous operation ever since.



TODAY, here's one of more than 1500 Carrier Absorption Refrigeration Machines in operation around the world. Today's modern Carrier automatic models cover a wide range of capacities from 50 through 1000 tons.

4 FACTS

TO REMEMBER WHEN YOU SPECIFY ABSORPTION REFRIGERATION

1 Carrier is years ahead of any other manufacturer in this specialized field. Carrier designed and built its first Absorption Refrigeration Machine fourteen years ago. This pioneer machine is delivering efficient, dependable service around the clock.

2 Today more than 1500 Carrier Absorption Refrigeration Machines are serving factories, office buildings, hospitals, hotels, schools, universities and other structures around the world. They have established an unmatched record for economy of operation.

3 Since the first machine, Carrier has effected many advances in design in its models. Today's Carrier Automatic Absorption Refrigeration Machines deliver the last word in efficient, reliable, low-cost cooling from low-pressure steam or hot water.

4 Carrier's long background of experience on every type of application is at your disposal. Qualified representatives are ready to work with you on your projects. Write Carrier Corporation, Syracuse 1, N. Y. In Canada: Carrier Engineering Ltd., Toronto.

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TYLOX®

Rubber

PIPE GASKETS

- √ ***REDUCE PIPE-LAYING COSTS***
- √ ***MAKE WATER-TIGHT JOINTS***
- √ ***WHIP ACID ATTACK***

Coupling TYLOX-Gasketed pipe is as fast as the few seconds required to shove pipe home into the line. Mud and water, as shown here does not slow up the work, or affect the compression seal.

Here's how . . .

TYLOX Gaskets "snap on" to pipe tongues in seconds . . . merely shoving the pipe home completes the joint. Being *flexible*, TYLOX compensates for pipe angularities, mud and water doesn't slow up coupling work, and laid line can be backfilled immediately. Construction costs are substantially reduced.

TYLOX Gaskets have seven sealing ribs that "pack" the annular space tight as pipe is coupled. A true *compression*, yet flexible seal is formed which prevents leakage of water *in* or *out* of the joints. Natural resilience of the TYLOX rubber keeps the seal water-tight. Root and sediment problems are prevented, and sewage treatment costs are reduced.

TYLOX Gaskets are made of rubber specially compounded for immunity to sewage and industrial waste acids and alkalies. Under ground and under compression, they outlast the life of the pipe itself.

SEND FOR ENGINEERING DATA AND ILLUSTRATED CASE HISTORIES ON TYLOX RUBBER PIPE GASKETS

HAMILTON KENT
MANUFACTURING COMPANY
KENT, OHIO
427 West Grant Street   Orchard 3-9555

***PROJECT:** City of Buena Vista, Va., trunk line to sewage treatment plant.

ENGINEERS: R. Stuart Royer & Associates, Richmond, Va.

CONTRACTOR: English Construction Co., Alta Vista, Va.

PIPE: TYLOX-coupled T & G in 15" to 24" diameters, manufactured by Roanoke Concrete Products Co., Inc., Roanoke, Va.

5123

CANADIAN: 10 Brussels St., New Toronto, Ontario, Phone: CLifford 1-2494 neers Joint Council in policy matters pertaining to the professional, economic and social status of the engineer, it is felt that they will undo much good that has been accomplished by both groups.

- Engineers who comprise the membership of the Registration Boards in the various states have made very slow progress in unifying requirements for license. It is high time that the requirements and procedures be resolved. This would have a profound influence in gaining the public's confidence.

There are many other problems involving public relations of the engineering profession. Subjects similar to those outlined above had better be discussed within the family by the respective groups and not allowed to become sensational news items. The engineering profession must unite in a harmonious effort to build up public confidence. This can only be done through a constructive effort and not through petty bickering and facetious remarks.

There are unquestionably two sides to every story; however, optimum results can be obtained through a harmonious adjudication of differences between groups involved. Perhaps engineers should take a leaf from the book of the medical and legal professions, whose observance of the canons of ethics and approved methods of practice have earned the public's confidence. It is high time that engineers close ranks and present a united front if they expect to retain and enhance the esteem and confidence of the public in their professional status.

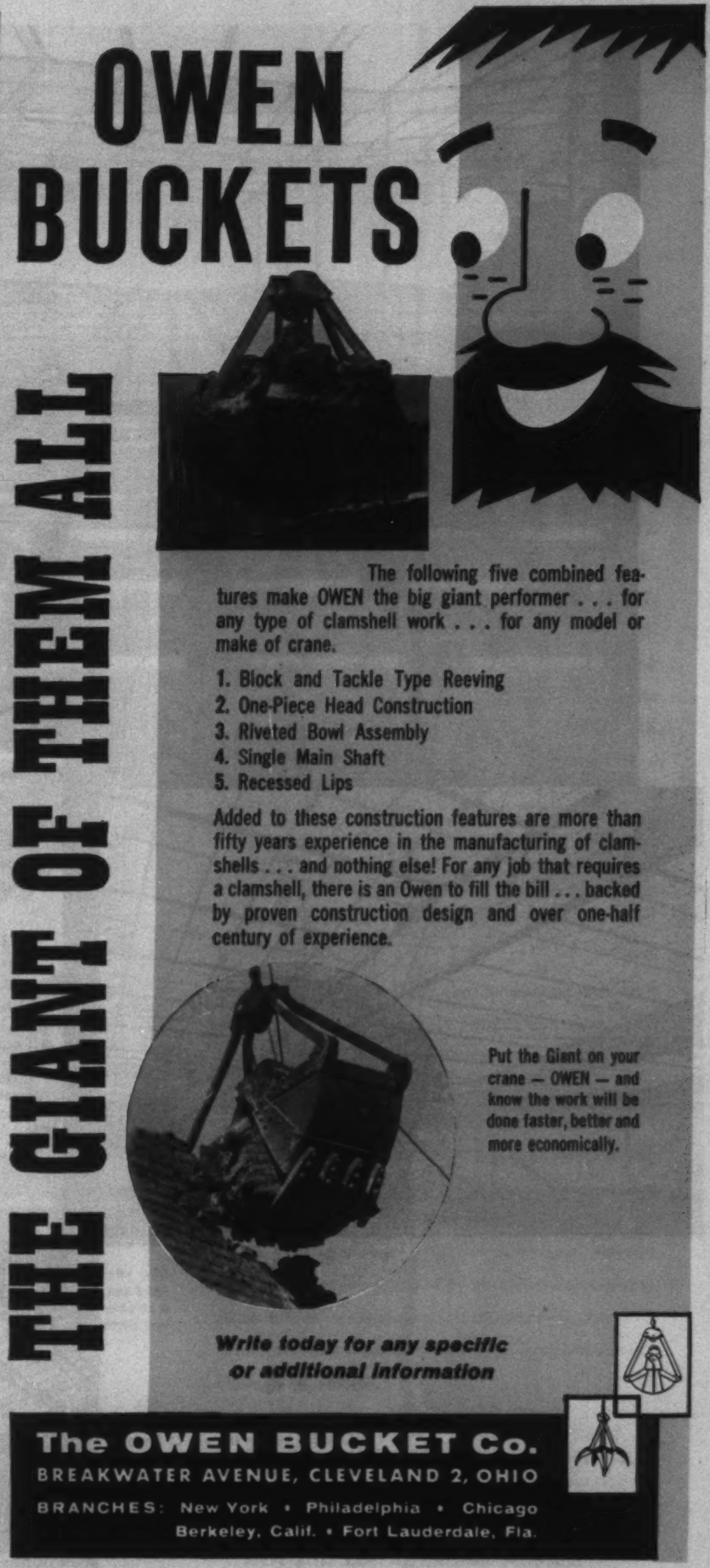
VICTOR W. BUHR
Clark, Buhr & Nexsen
Architects & Engineers
Norfolk, Va.

▶I suggest that engineers should cease fighting and criticizing each other, and should respect the ethics and principles of their profession, and utilize their efforts towards professional unity and respect instead of wasting valuable time instigating lynching raids among themselves.

MUJIB S. METTI
River Rouge, Mich.

▶I have been interested in the correspondence regarding the economy of highway engineering by highway department forces as compared with that by outside consulting firms. So far, there seems to be more heat than light on the subject, which is not surprising, considering that a real comparison would require a great amount of impartial statistical study. If such a study were made, it would probably be found that the economy would vary from side to side according to the relative ability of the engineers involved. However, the employment of private firms would seem to fill a need for flexibility in the size and adequacy of the engineering forces required.

What seems to me to be more important is that there should be competent engineering tribunals to decide



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THE GIANT OF THEM ALL

The following five combined features make OWEN the big giant performer . . . for any type of clamshell work . . . for any model or make of crane.

1. Block and Tackle Type Reeving
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Added to these construction features are more than fifty years experience in the manufacturing of clamshells . . . and nothing else! For any job that requires a clamshell, there is an Owen to fill the bill . . . backed by proven construction design and over one-half century of experience.

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BRANCHES: New York • Philadelphia • Chicago
Berkeley, Calif. • Fort Lauderdale, Fla.

Expansive? Yes! Expensive? No!— Wide open spaces were achieved economically with no loss of rigidity . . . through the use of Ceco Steeldome construction . . . in Engineering Building No. 5 of Autonetics, a division of North American Aviation, Inc.

Architects & Engineers: Bechtel Corporation

General Contractor: Lindgren & Swinerton

Ceco quality-approved Steel Joists were used as purlins to support the roof of Building No. 5. Joists were erected quickly, providing fire-resistant, non-shrinking, vermin-proof construction.

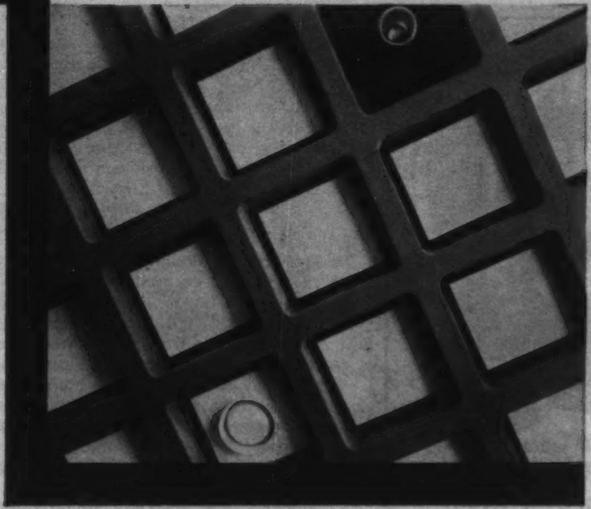
Illustrated here is the use of Ceco Steel Joist purlins in another Autonetics building—Autonavigator Production Building No. 4—to provide light but sturdy non-combustible roof framing.

AGREED: **Two-way concrete joist construction provides wide, rigid spans**

BUT QUESTION: **How can this construction be economically achieved.**

ANSWER: **With CECO STEELDOME SERVICE**

PROOF: If experience means anything, the acceptance of Ceco Steeldome service by architects, engineers, contractors and owners proves this: YOU CAN BEST DESIGN WIDE SPANS ECONOMICALLY WITH CECO'S TWO-WAY WAFFLE CONCRETE JOIST CONSTRUCTION. Building professionals accord Ceco unquestioned leadership in this field. Add Ceco's work in pioneering jet-air removal of Steeldomes for exposed concrete ceilings—and again you see Ceco in the lead. With Ceco Steeldome service you get these advantages:



Straight-up view of two-way concrete joist construction formed with Steeldomes. In this unretouched picture, the exposed concrete has been painted and the voids treated with acoustical tile. Voids also provide a new convenience for the placement of lighting fixtures, ventilators and intercom equipment.

1—Skillful workmanship in forming economical wide spans in monolithic concrete.

2—Workmanlike placement of Centering and Steeldomes. Dependable on-time delivery of fabricated reinforcing material.

3—Elimination of projecting beams without sacrificing rigidity, thus reducing story heights and facilitating installation of ducts and other mechanical equipment.

4—Surprisingly handsome ceilings of exposed concrete.

Backed by experience, we can say—nothing in the market tops Ceco Steeldome service. Project after project offers proof . . . so next time draw on Ceco's "library of experience" for better buildings of concrete joist construction. Ceco Steel Products Corporation. Sales offices, warehouses and fabricating plants in principal cities. General offices: 5601 West 26th Street, Chicago 50, Illinois.

CECO STEEL

IN CONSTRUCTION PRODUCTS CECO ENGINEERING MAKES THE BIG DIFFERENCE...

Steelforms / Concrete Reinforcing / Steel Joists / Metal Roof Deck
Windows, Screens, Doors / Cecoframe Buildings / Metal Lath

TOTAL MANUFACTURING FOR THE BUILDING INDUSTRY FROM RAW TO FINISHED PRODUCTS

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HORIZONTAL DOORS:
heavy-duty weathertight

spring-balanced for easy opening!

Choose Bilco doors to replace those ponderous, old-fashioned floor- and sidewalk-access doors. Bilco spring-balanced doors feature built-in drainage, long trouble-free life.

FREE CATALOG

Tells all you need to know about sidewalk and basement doors, roof scuttles, ceiling doors and flush floor doors; measurements, weights, specification data!

Bilco®

The Bilco Co.,
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New Haven Conn.,

HORIZONTAL SPRING-OPERATED DOORS

CIRCLE 4 ON READER SERVICE CARD

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USE LARGE FASTENERS BY

LARGE FASTENERS, 1-3/4" bolt diameter and larger, are our specialty! Standard and custom engineered nuts, bolts, threaded rods, turnbuckles, clevises, eye bars, loop rods are available to meet your large fastener needs.
FREE BULLETIN on large fasteners of every description. Write for Bulletin 160, Joseph Dyson & Sons, Inc., 5125 St. Clair Ave., Cleveland 3, Ohio, Phone HEnderson 1-6157.

DYSON

whether given proposed highways are needed at all at this period. Or are they in some cases being undertaken to keep an organization in work or to take advantage of Federal contributions?

THOMAS H. WIGGIN
Consulting Engineer
Norwalk, Conn.

▶ Mr. Donald A. Walsh (ENR Dec. 10, 1959, p. 6) is to be congratulated for bringing into clear focus the growing socialist cancer which is slowly choking the life out of private initiative on the part of the professional engineer.

I am sure Mr. Walsh can offer further proof of actual savings in engineering and construction than those he cited in his article. One which can be shown is bridge costs for similar loading and design, for over 200 bridges recently designed:

	Continuous Steel Beam	Concrete Slab
Consultant designed	$13.11/sq ft	$11.43/sq ft
Government designed	16.22	11.46

There is another point that might well have been brought into focus. The consultant should have an engineer of construction to interpret the designs, and with authority to disapprove substandard construction which is often permitted by Government engineers.

It must be clearly understood that there is a minority of thoroughly competent, honest, and non-political, non-patronage, engineers in government service, who do much more than the duty our profession requires. These are dedicated, responsible, professional engineers of the very highest character.

THOMAS GIBSON
Columbus, Ohio

▶ Mr. Walsh's intemperate outburst reflects no credit on himself or the profession. No more do some of the replies.

As always, the truth lies between the extremes. There are, and must be, exceedingly able engineers in both fields of endeavor. However, the various governmental agencies do attract a large percentage of the less able engineers, some of whom degenerate into technicians.

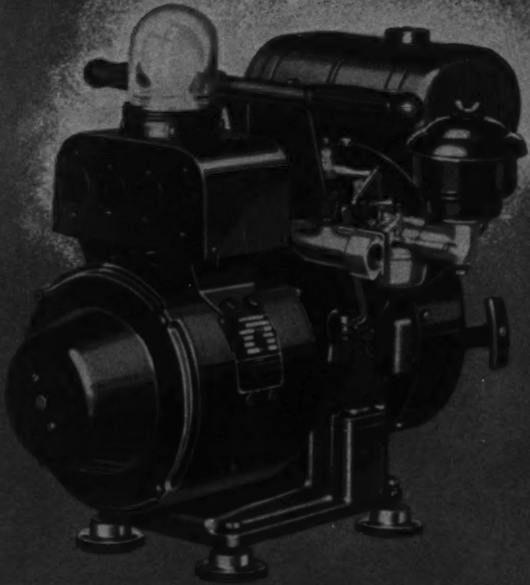
Similarly, the economic requirement that a consulting business, as any other, show a profit, and the wide variety of work there encountered, operate as a powerful and refining influence. The poor engineer is a luxury a business cannot afford.

Let us turn now to this concept of professionalism we engineers have. Why does the public not accept our definition of professional status, and insist on their own?

Whom does the public accept as professional practitioners of their art or craft? Let us say doctors, lawyers, architects, dentists and public account-

POWER with a reputation for rugged reliability

KOHLER ELECTRIC PLANTS



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Sizes to 100 KW gasoline or diesel

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MODEL K161
Sizes from 4 to 24 H.P.

Since 1920, Kohler electric plants, powered by Kohler engines, have provided a host of users with reliable, efficient electric power for sole supply, automatic stand-by and marine needs.

Also powered by Kohler engines are many kinds of equipment, produced by numerous leading companies, for use in construction, agriculture and industry.

With long experience in the production of internal combustion engines and electrical generating sets, Kohler Co. emphasizes ruggedness, conservative rating, ease of maintenance, ease of starting. Sales and service nation-wide. Write for illustrated printed matter.

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OF
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Sikorsky helicopters eliminate costly road building completely. They fly men, materials, equipment right to remote construction sites. Used *both* as a highly maneuverable CRANE and a high-speed TRANSPORT, a Sikorsky helicopter can save months of road building . . . eliminate many right-of-way problems . . . reduce your total costs dramatically. Examples? In New Guinea, an oil company flies a complete drilling rig with men and supplies to jungle locations. Once an eighteen-month operation, the entire job now takes just two months. In Puerto Rico's mountainous upcountry, a helicopter with three two-man ground crews can plant 100 power poles a day, three to four months' work with old construction methods. Savings in costs are from 70% to 80%. Want more facts on Sikorsky Aircraft "off-the-road" economies? Write us today.

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DEMONSTRATIONS PROVE CURTISS-WRIGHT SUPERIORITY

CW-226 — 26 CU. YDS. STRUCK

CWD-221 — 35 TON CAPACITY

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Greater Bowl Factors—Faster Cycles Give Top Profit Per Equipment Dollar

You know that the machine that moves the most dirt makes you the most money—but, how do you select that machine? By past experience? No, because constantly changing models, techniques and contract conditions make this method impractical . . . By appearances? No again! You wouldn't bid a job on surface appearances alone, so why risk your profits by buying a scraper by the same method.

This leaves only one practical solution to the problem of buying a scraper. That is actual performance evaluation in the field, with a decision based on load weights, bowl factors, cycle times and the many other points that add up to high production. As one contractor says: "We considered three other major makes of scrapers for the job, but comparison and field demonstrations proved Curtiss-Wright the best machine. We feel that the added production and high bowl factors will save several cents per yard for any contractor, as it has for us."

Savings such as this are the result of buying by proven performance. See these results for yourself with a Curtiss-Wright demonstration on your job.

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A C-W MODEL FOR EVERY APPLICATION

Five self-propelled scrapers with capacities from 8 to 26 cu. yds. struck, up to 36 cu. yds. heaped . . . Three interchangeable rear dumpers with 25 and 35 ton capacities . . . Six tractor-drawn scrapers with capacities from 8 to 30 cu. yds. struck, up to 39 cu. yds. heaped . . . A total of 14 high-performance machines covering the complete range of practical earthmoving applications.

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General Contractors:
Frank Messer & Sons, Inc., Cincinnati

Architects:
Potter, Tyler, Martin & Roth, Cincinnati

PROOF of the savings possible with

INTERNATIONAL STEEL'S *automated* EQUIPMENT

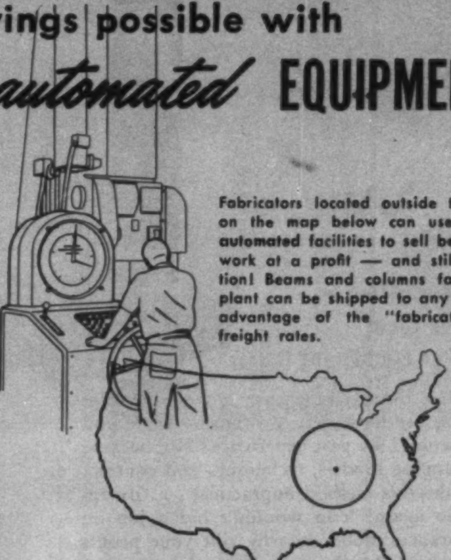
. . . first in the country!

Ohio Life's new building is the first construction project using International Steel's *automated* production facilities for beam and column work. Savings were effected because the fabrication of beams and columns . . . normally a step-at-a-time process . . . has now become a *single machine-controlled operation!* Precision tolerances never before practical can now be held. *Automation* at International Steel not only means lower prices, but also better products with better service!

SEND TODAY! To demonstrate possible savings, send us shop details on a specific job. We'll give you a firm price, with materials laid down on the job. See what your savings can be. Be first in your area to use the cost-cutting advantages of International's *automated* equipment for beam and column production!

INTERNATIONAL STEEL COMPANY

1647 Edgar Street • Evansville 7, Indiana



Fabricators located outside the area shown on the map below can use International's automated facilities to sell beam and column work at a profit — and still beat competition! Beams and columns fabricated in our plant can be shipped to any job site, taking advantage of the "fabricated in transit" freight rates.

Gentlemen:

I am interested in the savings advantages offered by International's automated beam and column production. Please send me complete information as quickly as possible.

NAME..

TITLE..

COMPANY..

ADDRESS..

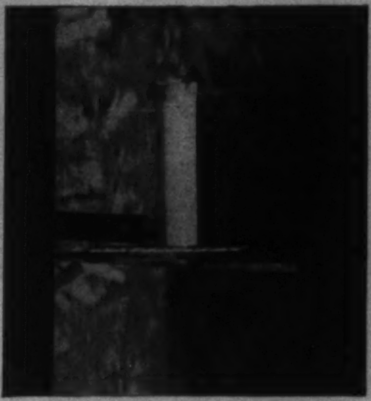
CITY............................ZONE.......STATE............................

Birth Of A Blast

Many unique tools are used by Spencer Chemical Company in blasting research. For example, these exclusive photos, taken at intervals of seven millionths of a second by a special camera, record the detonation of a 4-lb. mixture of Spencer N-IV Ammonium Nitrate and fuel oil.

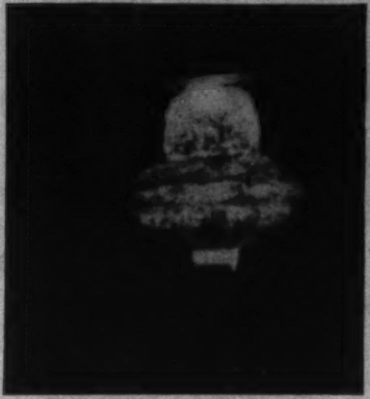
Research like this, conducted by Spencer's own staff, and sponsored by Spencer at leading U. S. research centers, results in new and better ways to use Spencer N-IV and fuel oil for blasting.

Spencer Chemical Company would like to share this knowledge with you. For information, use the coupon below.

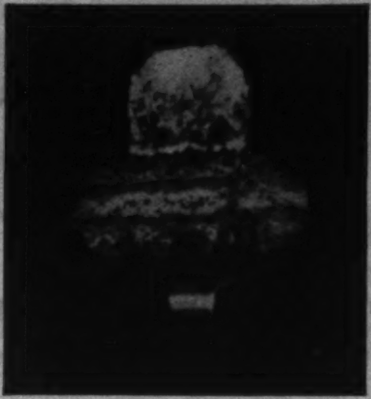


2:13 P.M. The 13"-long charge, containing 94% Spencer N-IV Ammonium Nitrate and 6% fuel oil is about to be detonated.

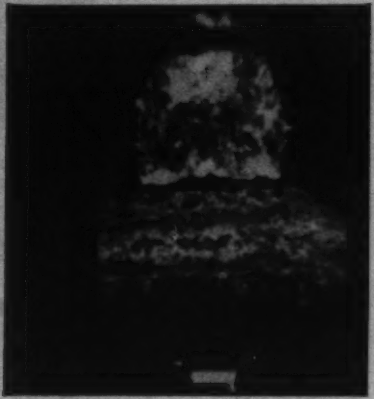
2:13.000028 P.M. The detonation wave has already spread over nearly one-third of the Spencer N-IV—fuel oil mixture.



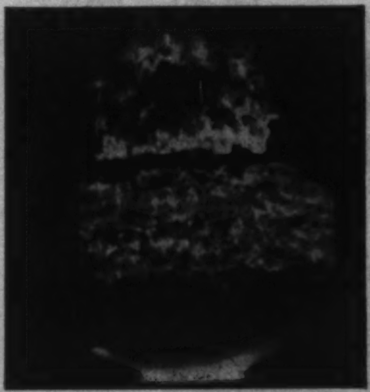
2:13.000056 P.M. This mighty, but controllable, energy is partly a result of N-IV's special structure and greater nitrogen content.



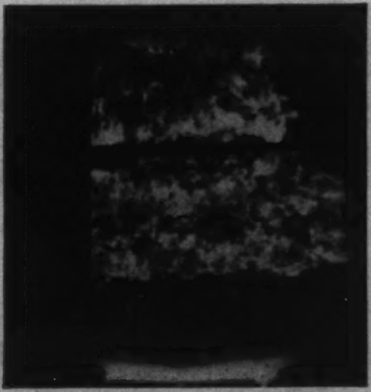
2:13.000088 P.M. Shown here is the great detonation velocity of the N-IV—fuel oil mixture. Yet, N-IV is safe to store and handle.



2:13.000128 P.M. The continuous and even release of energy shown here is a result of extensive Spencer research.



2:13.000160 P.M. Near maximum energy is now being released by the low-cost Spencer N-IV Ammonium Nitrate—fuel oil mixture.



2:13.000184 P.M. Full detonation! For information on how you can use Spencer N-IV Ammonium Nitrate, fill out, mail coupon at right.

SPENCER®

Spencer Chemical Company
407 Dwight Building
Kansas City 5, Missouri

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☐ Spencer Powder Monkey.

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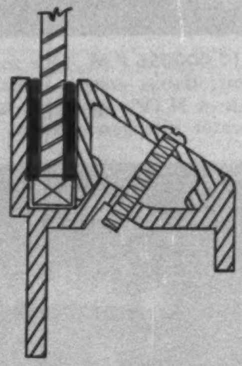
New *Pressureseal** 162.3 combines two proven products

1. elastic compound tape for intimate bonding
2. neoprene for lasting resiliency



Here at last is double insurance for a positive, lasting seal. New PRESSURESEAL unites . . .

Presstite No. 162 Elastic Compound Tape, already in wide use in the construction field where its excellent plasticity, adhesion and weather resistance are helping to achieve the controlled comfort found in many of today's new skyscrapers, with . . .

Neoprene, PRESSURESEAL's "core", a synthetic rubber well-known for its ability to "give and take" with the contraction and expansion of modern design.

United, these two proven products provide an *elastic bond* to seal . . . and a *resilient cushion* to absorb pressure loads.

WANT A SAMPLE? It's yours on request, along with illustrated literature. Call or write Dept. B-4.

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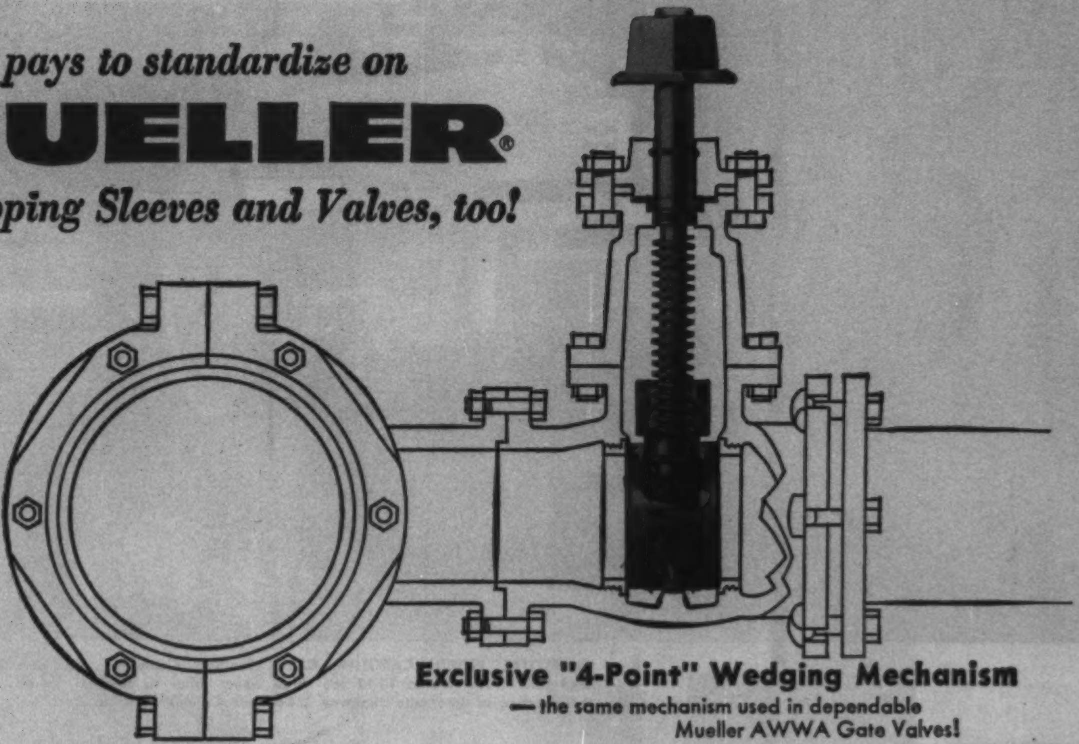
AMERICAN-MARIETTA COMPANY

KAP

3740 CHOUTEAU AVENUE • ST. LOUIS 10, MISSOURI *it pays to standardize on*

MUELLER®

Tapping Sleeves and Valves, too!



Exclusive "4-Point" Wedging Mechanism

— the same mechanism used in dependable Mueller AWWA Gate Valves!

Save time and money by specifying "quality-matched" Mueller Tapping Sleeves and Valves throughout your system.

Laterals and branch main connections may be made quickly and easily with unskilled labor under full line pressure and with no loss of water.

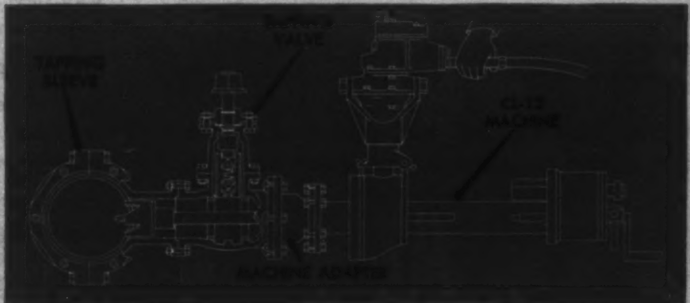
The extra long length and heavy cross sections of all Mueller Tapping Sleeves actually strengthens the main at the lateral connection. Mechanical joints or calked joints permit rapid pressure-tight installations. Just two sets of end gaskets readily adapt a nominal size of mechanical joint sleeve to all classes of cast iron pipe regularly used.

Smaller inventories, gained storage space and easier maintenance are yours if you've also standardized on job-proven Mueller Gate Valves. The wedging mechanism of non-rising-stem Mueller Tapping Valves is identical to that of Mueller AWWA Gate Valves. In fact, the parts are completely interchangeable! "O" ring stem seals or conventional packing are also available.

Mechanical joint and calked type sleeves and valves are available in a full range of main and branch main sizes.

Write for complete information and specifications on Mueller's full line of Tapping Sleeves and Valves.

Use the Mueller CL-12 Drilling Machine to install Tapping Sleeves and Valves faster than ever before.



These are just a few of the bonus features found in all "quality-matched" Mueller products for water distribution systems. Add up these features and you'll see why so many cities and towns have "standardized on Mueller."

MUELLER CO.
DECATUR, ILL.

Factories at: Decatur, Chattanooga, Los Angeles
In Canada: Mueller, Limited; Sarnia, Ontario

CHARLOTTE, NORTH CAROLINA—Blythe Brothers Company, general contractors, used their Huber-Warco 10-12 ton three wheel roller to compact "black base" on their section of Interstate Highway #26 near Columbia, South Carolina.

HUBER
WARCO

HUBER-WARCO

3 wheel rollers

SIZES FROM 10 to 14 TON

Huber-Warco 3-wheel rollers are made in General Purpose, Finishing, and Variable Weight models to fit every 3-wheel roller need.

TORQUE CONVERTER tailshaft governor and two speed transmission are standard. Doubles available power, cuts fuel costs, increases life of machine components one-third to one-half.

SPECIAL SUB FRAME suspended at three points carries engine and transmission assembly and cushions outside shocks to increase machinery life.

GUIDE ROLL assembly has tapered roller bearings and is completely adjustable. Retains factory new adjustment indefinitely. Kingpin housing is removable.

OTHER FEATURES include replaceable tire design, differential lock, variable speed hydraulic steering, pressure sprinkling system, choice of gasoline or diesel engines.

A trusted product name backed by respected distributor names from coast to coast

MOTOR GRADERS	TANDEM ROLLERS	3-WHEEL ROLLERS	MAINTAINER
Standard transmission models from 83 to 160 H.P. Torque converter and power shift transmission models from 102 to 195 H.P.	3-5 Ton • 4-6 Ton Retractable • 5-8 Ton • 8-10 Ton • 8-12 Ton • 10-14 Ton	10-Ton • 12-Ton • 14-Ton Standard Weight 10-12 Ton • 12-14 Ton Variable Weight	M-52 — 45½ H.P. Attachments are Lift-Loader, Broom, Bulldozer, Patch Roller, Scarifier, Snow Plow, Berm Leveler

HUBER-WARCO COMPANY Marion, Ohio, U.S.A.

Announcing . . .
Ozalid's new 30-inch

STREAMLINER 100

Now you can have a compact table-top whiteprinter with "big machine" features at a slim-budget price. And you can enjoy the convenience of on-the-spot printmaking round the clock. Make all the prints you need, inexpensively and without delay. There's no make-ready or cleanup . . . anyone can learn to use the 100 in minutes. Check these important features:

- Makes prints up to 30" wide by any length
- Front and rear print stacking
- Simple dry-developing system
- Easy turn-on, turn-off controls
- Smooth-running electronic drive with speeds up to 14 fpm
- Hook-on tracing receiving tray (optional at extra cost)

And the versatile Streamliner 100 handles the whole range of Ozalid sensitized materials . . . lets you turn out gum-backed labels, photographs, cloth maps, or color transparencies!

For complete details on the new Streamliner 100, mail coupon today!

OZALID

Division of General Aniline & Film Corporation
In Canada: Hughes-Owens Co., Ltd., Montreal

Ozalid, Dept. YY-3, Johnson City, N.Y.

Please send me free descriptive brochure on the new Streamliner 100.

Name____________________
Company____________________
Position____________________
Street____________________
City__________ Zone__________
State____________________

SHERATON-PORTLAND HOTEL ACHIEVES BOTH LUXURY AND ECONOMY WITH PORCELAIN ENAMEL PANELS

To create an overall theme of elegance and beauty for this completely modern hotel, architects Perry, Shaw, Hepburn & Dean specified porcelain enamel steel panels. The supplier chose Inland enameling iron for its uniform flatness and excellent enameling characteristics. Finished panels were delivered to the site set in metal frames. They were extremely easy to install and provided 15,000 square feet of refreshingly colorful design.

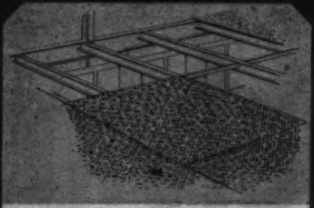
Porcelain enameled panels are simple to clean, acid-resistant, weather-resistant and colorfast. They completely eliminate later refinishing costs generally required with ordinary painted panels—make present and future maintenance of this attractive hotel extremely economical.

For complete information on the economy and efficiency of curtainwall construction, call or write the curtainwall manufacturer nearest you, the Porcelain Enamel Institute, or Inland Steel Company.

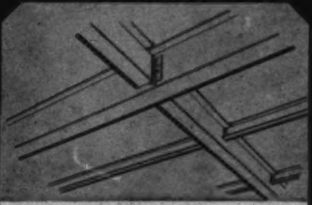
Montag, Inc., manufacturers of the porcelain enameled panels used, selected 16 gage, stretcher-leveled enameling quality steel supplied by Inland Steel Company—had no trouble meeting architect's specifications for color (grey), size and flatness.

Use Steel For Modern Construction

other Inland construction products

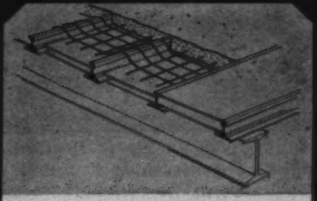


4-WAY SAFETY PLATE has come into general use as an integral, prefabricated part of the supporting structure, providing durable floors and added strength.



WIDE FLANGE BEAMS are the answer wherever more strength with less weight, longer spans with more open floor area, is the goal. Sizes from 8′ to 24′.

INLAND ENAMELING IRON is ideally suited to curtain-wall and enameled panel systems, providing strength, beauty and unlimited design possibilities.



INLAND SUB-PURLINS are especially designed to provide a lighter, more efficient member for shorter-span roofs. They come cut-to-length and mill painted.

INLAND

INLAND STEEL CO.
30 West Monroe Street
Chicago 3, Illinois

CIRCLE 8 ON READER SERVICE CARD

ants to name a few. What is the big difference between their practice and the practice of engineering by the great majority of engineers? It is this: these men are operating businesses. They have problems in common with the man who runs the shoe store and lunch counter. In addition, their business requires special training which elevates their status above that of the lunch counter operator. He can understand and appreciate this. And he bestows on them the professional status he refuses to those of us who do not share his problems of free enterprise.

If engineers in government employment are truly interested in raising the status of the profession as a whole, they should recognize the fact that it cannot be done in society meetings. It must be done in the market place. And the consultants are the only ones active in the market place. Therefore, their efforts should be to put aside the envies and jealousies (this applies to both groups) to which we are all susceptible, and bend every effort to help, not tear down, those representatives of our profession who are just that, in the public eye.

HENRY F. BALL
Sulphur Springs, Texas

Construction Coexistence

SIR—First, let me say that I am an avid admirer of your magazine, as I believe it is one of the few unbiased printings still obtainable. You seem to present both sides of any particular controversy with complete sincerity and without regard to whose toes are stepped on. Most of us need our toes stepped on occasionally.

Second, there is one particular subject which raises the hair on the back of my neck every time I encounter it: the attitude of monetary dominance that seems to have enveloped our country. Two of the most recent examples are the discussion over who should bear the cost of highways and the mounting cold war between steel and concrete as building materials.

The pathetic fact about these adolescent arguments is that they are indulged in by supposedly intelligent, well informed, educated men. It seems that these are the men who especially should be striving to promote an attitude of "togetherness" so that, by working together and sharing ideas, a better nation and, ultimately, a better world in which to live can be obtained.

I believe we could all stand a look at ourselves and see if we can't strive a little harder to develop an attitude of "What can I do to contribute?" rather than "What's in it for me?"

In this connection, I recall a small sign hanging in the office where I work. It says: "Are you really trying to help with the solution or are you part of the problem?"

LINTON E. GAY, JR.
Savannah, Georgia

(*Reader Comment continued p. 32*)

Exclusive
POW-R-GRIP* Ridges!
Anchor anything to concrete...permanently

BULLDOG
Gold Digger

*POW-R-GRIP ridges around the shank of the BULLDOG "Gold Digger" drill/anchor permit *faster, easier drilling* into hardest concrete, brick or stone. Once the drill/anchor is set, these powerful ridges, plus the proven expansion principle of "Gold Digger" drill/anchors, assure greatest holding-power under all job and climatic conditions. Only POW-R-GRIP ridges assure "the grip that never fails".

Send for full details today!

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BULLDOG DIVISION
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GREGORY INDUSTRIES, INC.
102-40 Toledo Avenue • Lorain, Ohio

Please send *free* specification and application booklet.

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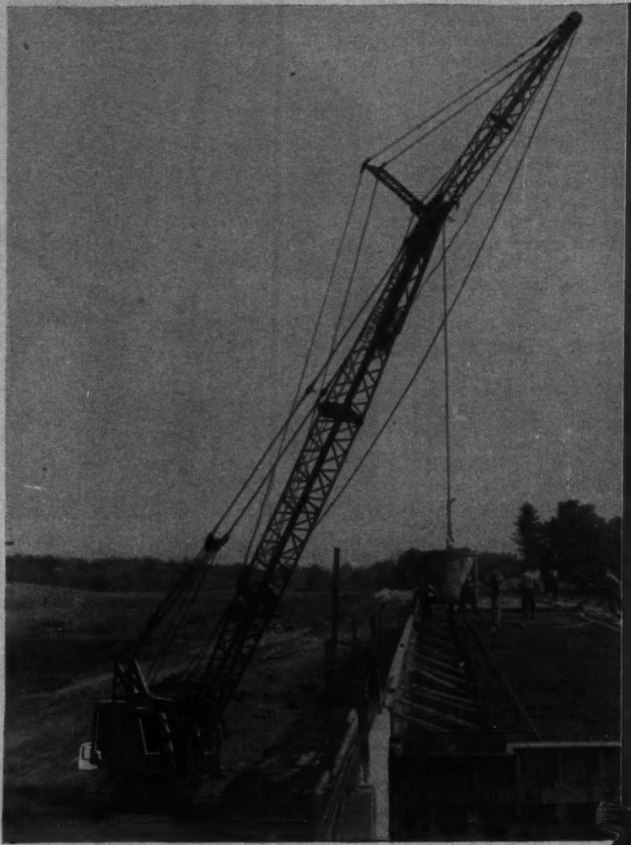
CIRCLE 29 ON READER SERVICE CARD

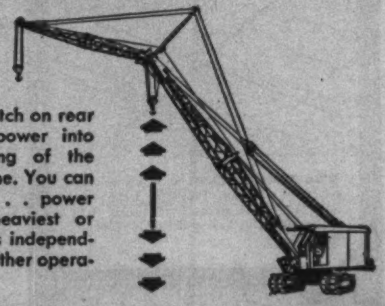
Only with LINK-BELT SPEEDER Full-Function Design...

perform up to 6 operations

simultaneously or

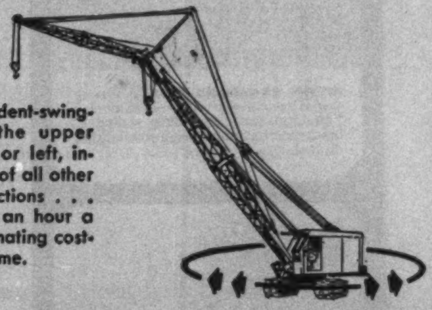


1 POWER UP OR DOWN MAIN LOAD LINE

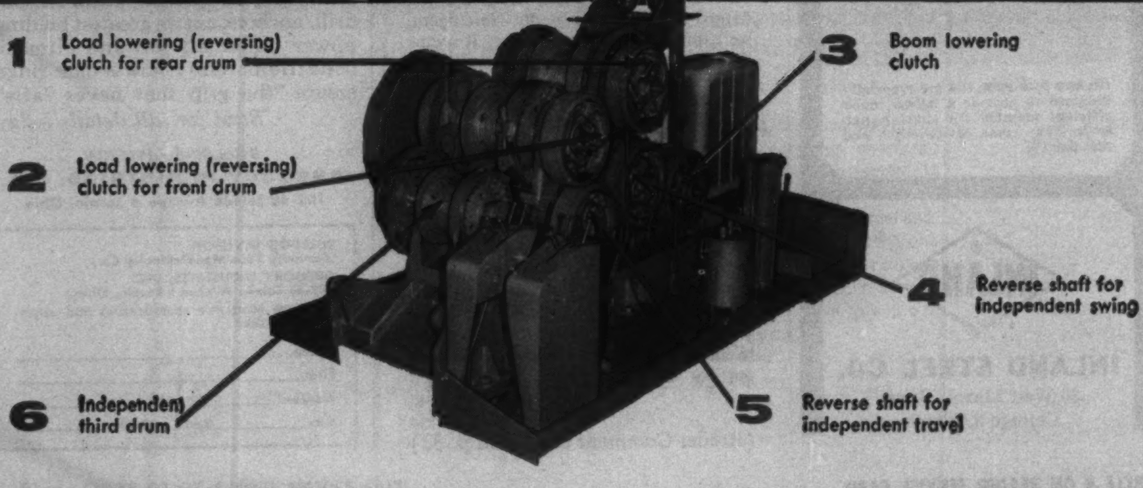


Reversing clutch on rear drum puts power into load lowering of the main hoist line. You can power up . . . power down the heaviest or lightest loads independently of all other operations.

4 SWING RIGHT OR LEFT

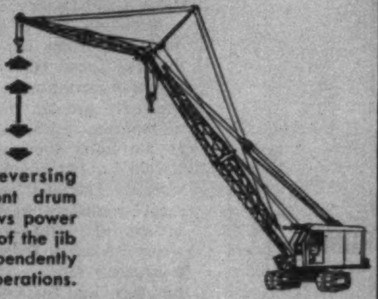


With independent-swing-and-travel, the upper swings right or left, independently of all other machine functions . . . saves up to an hour a day by eliminating costly shifting time.


1 Load lowering (reversing) clutch for rear drum
3 Boom lowering clutch
2 Load lowering (reversing) clutch for front drum
4 Reverse shaft for independent swing
6 Independent third drum
5 Reverse shaft for independent travel

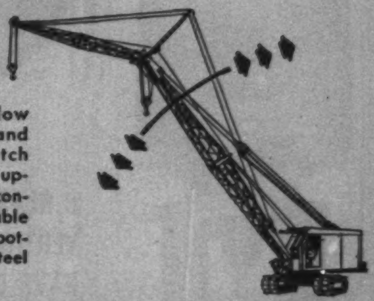
independently!

2 POWER UP OR DOWN SECONDARY LOAD LINE



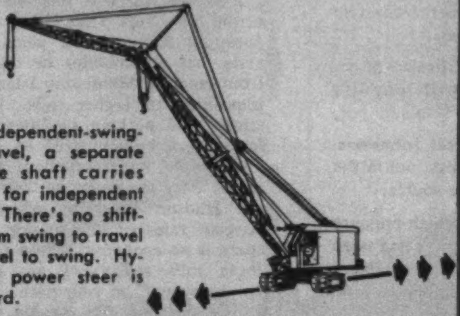
Exclusive: a reversing clutch for front drum also . . . allows power load lowering of the jib whip line independently of all other operations.

3 HOIST OR LOWER BOOM UNDER POWER



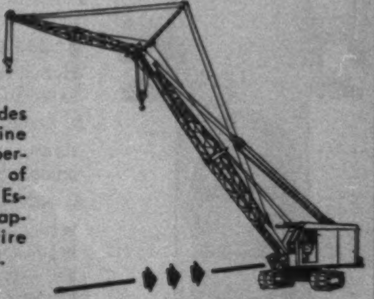
Independent high-low speed boomhoist and boom lowering clutch provide fast, safe up-and-down booming control. Especially valuable for high-accuracy spotting jobs such as steel erecting.

5 TRAVEL FORWARD OR BACKWARD



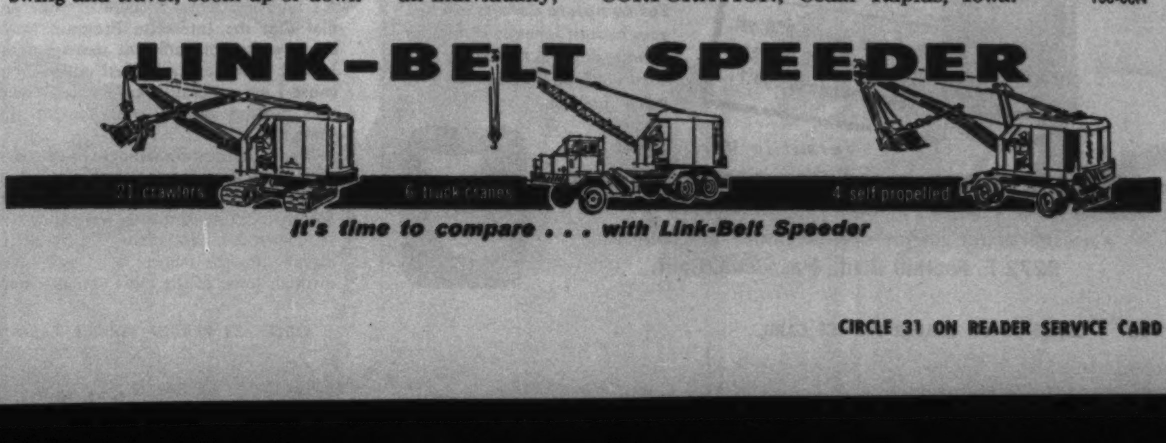
With independent-swing-and-travel, a separate reverse shaft carries power for independent travel. There's no shifting from swing to travel or travel to swing. Hydraulic power steer is standard.

6 OPERATE INDEPENDENT THIRD DRUM



A third drum provides one more load line which, again, is operated independently of all other functions. Especially useful for applications that require "snaking" in a load.

Link-Belt Speeder's years-ahead Full-Function Design is standard on all models up through the 40-ton "108" Series. Because of this exclusive design concept, your operator can have completely independent control of *all* lifting or excavating applications. He can power individual load lines up or down, crowd or retract, swing and travel, boom up or down — all individually, or in any combination, depending on the job. *And only those components he puts in use are under load;* all others revolve freely on anti-friction bearings. This design practically *doubles* machinery life. Get the complete Full-Function Design story from your distributor. Or, write LINK-BELT SPEEDER CORPORATION, Cedar Rapids, Iowa. 106-60N



LINK-BELT SPEEDER

It's time to compare . . . with Link-Belt Speeder

CIRCLE 31 ON READER SERVICE CARD

6 REASONS WHY JOHNSTON VERTICAL HIGH PRESSURE PUMPS HAVE BECOME SO POPULAR

Many uses: as suction boosters, in power plants, pipe lines, refineries, for bulk plant transfer, in municipal booster service.

1. **SPACE SAVING** —You get 3 times the capacity in ⅓ the space, with vertical Johnstons.
2. **LESS DOWN TIME** —Johnston verticals are designed for trouble-free operation with long-life expectancy.
3. **LONG BEARING LIFE** — In vertical Johnstons, thrust is taken up in the motor bearings, not in the pump, eliminating a frequent trouble source.
4. **NON-OVERLOADING** —Johnston high-pressure verticals have both a flat horsepower curve and steep head-capacity characteristic, making for economy and safe operation. With a Johnston, there is no danger of an overload.
5. **EASY CONNECTIONS** —It's easier to make piping connections with a Johnston vertical.
6. **GREATER EFFICIENCY** —Johnston's accommodate variations in head by staging, as well as by trimming the impellers, thus giving much greater efficiency over a vastly wider range.

Pressures over 1,000 psi.
Capacities to 12,000 gpm
Temperatures to 600°F.

For complete details talk to your nearest Johnston distributor or write direct to the factory for colorful "Type C Industrial Pump" bulletin.

Versatile Verticals by...

JOHNSTON PUMP COMPANY

A DIVISION OF THE YOUNGSTOWN SHEET AND TUBE COMPANY
3272 E. Foothill Blvd., Pasadena, Calif.

What Price Roads?

Sir—I am compelled to be somewhat critical of the editorial "Is That Trip Necessary?" (ENR Jan. 21, p. 100). In its own way it represents a position quite as vulnerable as that taken by Senator Byrd on our federal highway program.

Two significant considerations have apparently escaped your recognition. The first of these is that no proof of any sort exists for the proposition that investment in highways is any more of a stimulus to economic growth than investment in other public facilities, such as schools or sewage disposal systems, which can be demonstrated to show a satisfactory direct return.

A second, and in the present context more important consideration, is that the true social cost of providing highway transportation in our urban areas is assuredly greater than the mere cost of building roads and buying gasoline. In particular there are two costs that should be, but are not, ordinarily considered. The first, and in the long run most significant of these, is the cost of the decentralization of urban activity resulting from the removal of productive land in the urban core for highway and parking purposes. The second is the cost to the community as a whole of the congestion caused by the addition of more and more vehicles to the city streets.

It is this last cost that the Director of the New York State Office of Transportation has in mind when he suggests that automobiles be discouraged from entering Manhattan Island by the imposition of higher tolls. Until the streets and parking facilities in Manhattan can be improved so as to accommodate more vehicles, it is economic folly to encourage them to cross the Hudson River by offering them bargain rates on the tunnels. To say there is no economic reason for raising these tolls reflects, I am afraid, a "myopic view" on your part.

The question that people are properly asking is not the one that you posed, but: "Is that trip worth as much to the individual making it as it costs the whole community?"

A. S. Lang
Asst. Professor of
Transportation Engineering
Massachussets Institute of Technology

▶ I take provincial issue with your denial that the Interstate Program lacks conservative and efficient management. I must concede my limited outlook because I am generally familiar only with that portion of the program for the State of Maine.

Many interesting things have been done here in the name of Interstate transportation and national defense. Some would be amusing, were they not so expensive. Interstate 95 is being driven up the shore of Casco Bay through some of the most valuable resi-

MASSEY-FERGUSON
INDUSTRIAL EQUIPMENT'S claim of

"CAN DO" is backed by

"HAVE DONE" PERFORMANCE!

M F

Producing Sizeable Power for the "Sensational 60's!"

This 40-h. p. Massey-Ferguson 204 Industrial Tractor has been put to the test and has proven popular and profitable for users all over the continent. See what its Instant Reverse, and power-matched loader CAN DO for you!

MASSEY-FERGUSON
224

COMPARE THE "CAN DO"

THE RUGGED... DEPENDABLE
MASSEY-FERGUSON 1001 TRACTOR SHOVEL

Experience supports the claims made for this 1-cu.-yd. (SAE rated) Tractor Shovel. It has so much speed and maneuverability on the job that it **does** work circles around larger, more expensive, single-purpose machines. Featuring Instant Reverse for fast cycling without shifting, it can load, back out, dump, and be back for more while others are still on the way. It gets heaped loads because of direct thrust from pivot points to bucket tip, 36° bucket rollback at ground level, 46° at 3′ carry, and 9300-lbs. pryout capacity. Telescoping arms reach 124″ at hinge point for high dump, and 51° dump angle speeds up dumping. Compare it in price, performance, and quality, you'll see why it says, "CAN DO" to a multitude of jobs.

WORK BULL 1001

THE MASSEY-FERGUSON 1001 CAN BE EQUIPPED WITH ALL THESE ATTACHMENTS:

75″ Bucket (1 cu. yd. SAE rated) ● 65″ Bucket (⅞ cu. yd. SAE rated) ● Ram Pick-Up Street Sweeper
Ram Blacktop Spreader ● Ram Rotary Snow Blower ● Ram Leaf Loader ● Rotary Backhoe
Rotary Broom ● Angle Dozer ● Swinging Crane ● Scarifier ● Lift Fork

ABILITY OF MASSEY-FERGUSON AGAINST ANY IN THE FIELD!

FEATURING INSTANT REVERSE with TORQUE CONVERTER

gives you Faster Speed...Greater Maneuverability...Increased Profits

Instant Reverse in Massey-Ferguson Industrial Equipment is a tried and proven money maker. It lets you move forward or back with a touch of your toe – without shifting, clutching, or pulling levers. Just press one pedal to go forward; another to go reverse. Acceleration is built in each pedal. You can pre-select the proper working gear for each job and work as fast in reverse as in going forward. Think of the speed, convenience, and maneuverability this gives you. Is it any wonder, owners of Massey-Ferguson Industrial Equipment are enjoying higher profits?

THE MASSEY-FERGUSON 406 TRACTOR SHOVEL

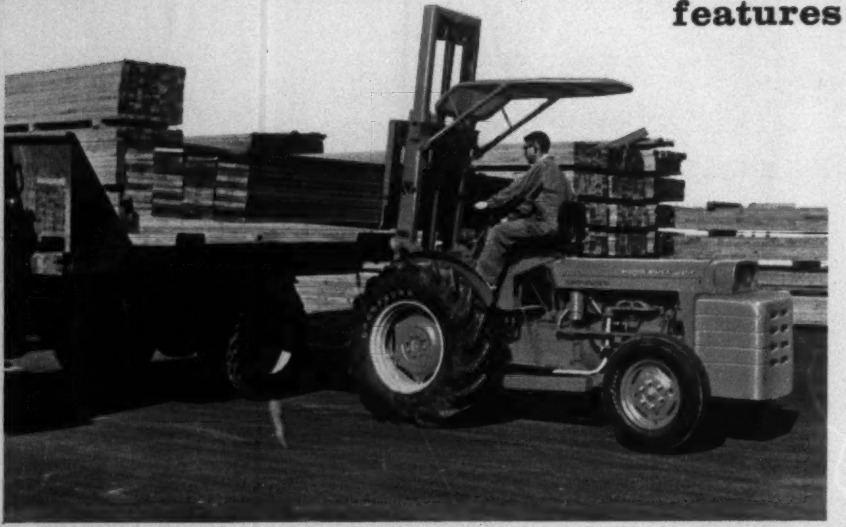
This 1-cu.-yd. (SAE rated) Tractor Shovel also has Instant Reverse, direct thrust from pivot points to bucket tips, and telescopic reach. Operator's control zone is positioned for excellent visibility from any angle. It has big-machine performance with small-machine economy and agility. It likewise is a highly versatile machine — available with many of the same attachments as the Massey-Ferguson 1001. It is designed to accommodate the Famous Massey-Ferguson Backhoe.

THE FAMOUS MASSEY-FERGUSON BACKHOE ...MASTER IN TICKLISH DIGGING —INCLUDING FLUSH

The Massey-Ferguson 220 Backhoe is by far the best buy in its field. It provides unexcelled visibility for precision digging. It is the first backhoe ever designed to dig flush alongside walls, fences, or buildings ... and it's the only flush digging backhoe that lets the operator sit directly in line with the bucket. Hydra-slide positioning hydraulically shifts the entire digging assembly, mast, seat, and controls left or right. It has 14,000 lbs. breakout power to permit digging in frozen ground or through blacktop.

THE NEW Massey-Ferguson 204 FORK LIFT

also features INSTANT REVERSE



Now, the Massey-Ferguson Fork Lift is equipped with **Instant Reverse!** Shifting or clutching to move in or out for a load is strictly old fashioned. Instant Reverse provides maximum maneuverability and frees your hands to control the load and steer the tractor. With this Fork Lift you can move heavy loads on unpaved rough or soft areas without bogging down. It has a wide range of attachments including a 20-ft. mast extension!

HERE'S A LIST OF VERSATILE ATTACHMENTS FOR MASSEY-FERGUSON INDUSTRIAL EQUIPMENT

Massey-Ferguson 1001

- 75" Bucket 1 Cu. Yd. (SAE rated)
- 65" Bucket ⅞ Cu. Yd. (SAE rated)
- Ram Pick-Up Street Sweeper
- Ram Blacktop Spreader
- Ram Rotary Snow Blower
- Ram Leaf Loader
- Rotary Backhoe
- Rotary Broom
- Angle Dozer
- Swinging Crane
- Scarifier
- Lift Fork

Massey-Ferguson 406

- 75" Bucket 1 Cu. Yd. (SAE rated)
- 65" Bucket ⅞ Cu. Yd. (SAE rated)
- Ram Pick-Up Street Sweeper
- Ram Leaf Loader
- Massey-Ferguson Backhoe Models 185 or 220
- Rotary Broom
- Angle Dozer
- Swinging Crane
- Scarifier
- Lift Fork

Massey-Ferguson 204

- Massey-Ferguson Front End Loaders Models 99, 101, 102
- Massey-Ferguson Backhoes Models 185 or 220
- No. 4 Scarifier-Scraper
- No. 5 Front Angle Dozer
- Multi-Purpose Blade
- Pipe and Cable Layer
- Post Hole Digger
- Reversible Soil Scoop

Massey-Ferguson 204 FORK LIFT

- Standard Forks
- Block Tines
- Hydraulic Side Lift
- 20' Mast Extension
- 13 Cu. Ft. Material Bucket
- Load Clamp
- Log Hook
- Angle Dozer

Massey-Ferguson 202

- Massey-Ferguson Front End Loaders Models 99, 101, 102
- Massey-Ferguson Backhoes Models 185 or 220
- No. 4 Scarifier-Scraper
- No. 5 Front Angle Dozer
- Auburn Trencher
- Lev-L-All Grader Attachment
- Multi-Purpose Blade
- Pipe and Cable Layer
- Side Mounted Mower
- Rotary Tiller
- Post Hole Digger
- Reversible Soil Scoop

Massey-Ferguson LOADERS

- Material Bucket
- Landscape Bucket
- Utility Bucket
- Flare Bucket
- Snow Bucket
- Heavy-Duty Material Bucket
- Lift Fork with or without Crane Attachment
- Angle or Straight Dozer
- Scarifier

Massey-Ferguson BACKHOES

Model 220

Rotary Boom Swing cylinder with 200° continuous arc. Has Hydra-slide positioning that shifts digging assembly to left or right for flush digging.

Model 185

Has conventional boom swing cylinders with 3-hole adjustment. Digs at right angles to tractor.

Buckets:

Model A
12", 16", 20" and 24" width

Model "A" Utility
36" width

Model B
(for extreme depths — 13' maximum)
18" and 24" width

Model "C" Clay
12", 16", 20" and 24" width

Shovel
24" width

Bell Hole
16", 22", 24", 30", 34", 36" and 38" width

Why Wait? Set a Date . . . . . . We'll Demonstrate!

M F

MASSEY-FERGUSON INDUSTRIAL DIVISION

BLOCK 1000 SOUTH WEST STREET
WICHITA 13, KANSAS

MF60-17

Litho. in U.S.A.

dential property in the state, through and over the harbor of a formerly attractive and picturesque historical coastal village and thence onward to dump smack into a city of 8,000 population. It is interesting to note here that had 95 been located a matter of a mile or two to the northwest, it would have encountered essentially unsettled country.

Once again, Maine was in such a rush to get in on "free" Federal funds, it started another section, northerly from Augusta, with such inadequate center-line borings that a great deal of unexpected bedrock was encountered in construction and slowed progress. Farther north, at Waterville, . . . the engineers . . . put the road across Messalonskee Stream at a place where gelatinous glacial clay was several hundred feet thick, thence smack into a steep hillside made of rock. The state of Maine highway engineers ignore their primary protagonists: the citizens and the earth.

Touring farther north, we find the road threading unknowingly over known deposits of sand and gravel, into predictable litigation, finally to disgorge, as per habit, into the business district of the City of Old Town.

I don't question highway need; I question highway planning and management.

John R. Rand
John R. Rand Inc.
Augusta, Maine

Prestressing Inspection

Sir—George R. Wadleigh wisely directs attention to the importance of inspection and maintenance in engineering work (ENR, Dec. 3, 1959, p. 14). But he should tell us where he got the idea that the compressive sinews (generally steel strand, wires or bars) are exposed in prestressed concrete.

In pretensioned concrete the sinews must be adequately covered with very high-strength concrete to provide the necessary bond to maintain the prestressing forces.

When the post-tensioning method is used, the sinews are placed through ducts in the concrete, stressed to the desired levels and covered with high-strength cement grout.

We heartily agree that prestressing introduces much initial economy and we should like to express the opinion that prestressed concrete is the most durable, maintenance-free material for structures which has been developed up to now.

J. Ashton Gray
President
Dura-Stress, Inc.
Leesburg, Fla.

►In reply to Mr. J. Ashton Gray, I do not think that my letter implied "exposed" reinforcing in prestressed concrete.

In the several methods of building prestressed beams and slabs—with good

CIRCLE 37 ON READER SERVICE CARD→

Leading contractors use Ramset to

CONTROL FASTENING COSTS

Ramset's speed, mobility, versatility and efficiency assure lowest possible fastening cost on every construction job. Ramset powder-actuated fastening eliminates tedious drilling and plugging . . . is up to 15 times faster than other methods. Just a pull of the trigger sets a drive pin, threaded stud or eye pin permanently in steel or concrete. Ramset's proven quality is your assurance of consistent performance, time after time.

For quick, economical fastening, even in the toughest spots, you can depend on Ramset tools, fasteners and charges. Your Ramset dealer will be glad to demonstrate, right on your job! Call him (under "Tools" in Yellow Pages) or write us direct for cost-cutting advice on your fastening requirements.

INSIST ON THE
RED TIP FASTENER WITH THE ● TOP

Ramset® Fastening System
OLIN MATHIESON • WINCHESTER-WESTERN DIV. • 287-X WINCHESTER AVE. • NEW HAVEN 4, CONN.

ALLIED *Jet Seal* on the job at

NIAGARA

THE WORLD'S GREATEST POWER PROJECT

Sealing a vertical joint on the 22½ ft. radius dome of the conduit.

Allied JET SEAL (Hydraulic Product 9015-T-1) is the specified concrete conduit sealant for the $850 million Niagara Power Project.

The twin, giant conduits—66 feet high and 44 feet wide—are a major part of this New York State Power Authority project that will supply nearly two million kilowatts of electricity to New York, Pennsylvania and Ohio.

Allied JET SEAL was chosen as the preferred sealant for the conduit domes because of its superior application, adhesion, rapid curing time and long life.

ALLIED JET SEAL APPLIED ROUND THE CLOCK . . . IN ALL WEATHER

At Niagara crews are applying Allied JET SEAL to the reinforced concrete conduits along three longitudinal and regular transverse joints of the arched dome cover (see photo above).

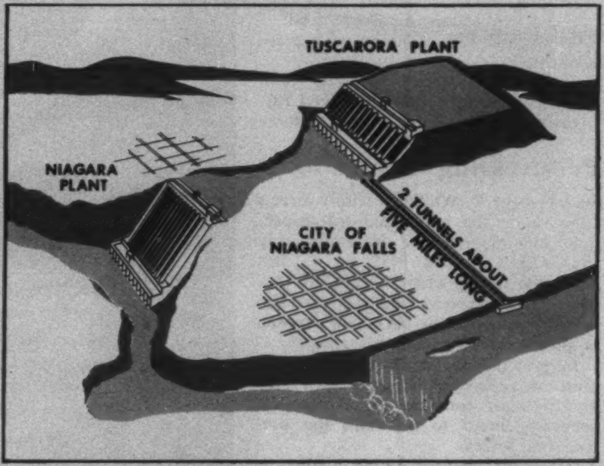
Laid in trenches as deep as 180 feet, the conduits will be covered with fill so that the surface can be utilized. The dome of the conduits must be strong enough to support this weight and tight enough to contain the water. Allied JET SEAL's outstanding resiliency and tough waterproofing qualities help make this possible.

The two-component, polysulfide-based sealant is applied after sand-blasting of the concrete joints. Upon curing it develops a tight bond with the concrete interface of the joint. It remains resilient and able to absorb contraction and expansion without cracking or breaking away from the joint.

Application is done with specially equipped rigs (shown above) capable of applying JET SEAL at 90°F in all kinds of weather. The primary unit in this set-up is the special JET SEAL Applicator, originated and manufactured by Allied.

Where a superior joint sealant is called for—as at Niagara—Allied JET SEAL is ready to meet and TOP the specifications. It is in use now on many major projects throughout the country: Hydraulic (JET SEAL 9015-T) Highway (JET SEAL 9015-H) Military (JET SEAL 9015-M).

For more of the story of Allied JET SEAL, the Superior joint sealant, write:



Allied JET SEAL Protects 82,000 Feet of Concrete Conduit

The twin conduits where Allied JET SEAL is being used (shown in red) stretch from the in-take facility (lower right) to the open canal. This diverted water is then lifted by pumps into the reservoir above the Tuscarora Station.

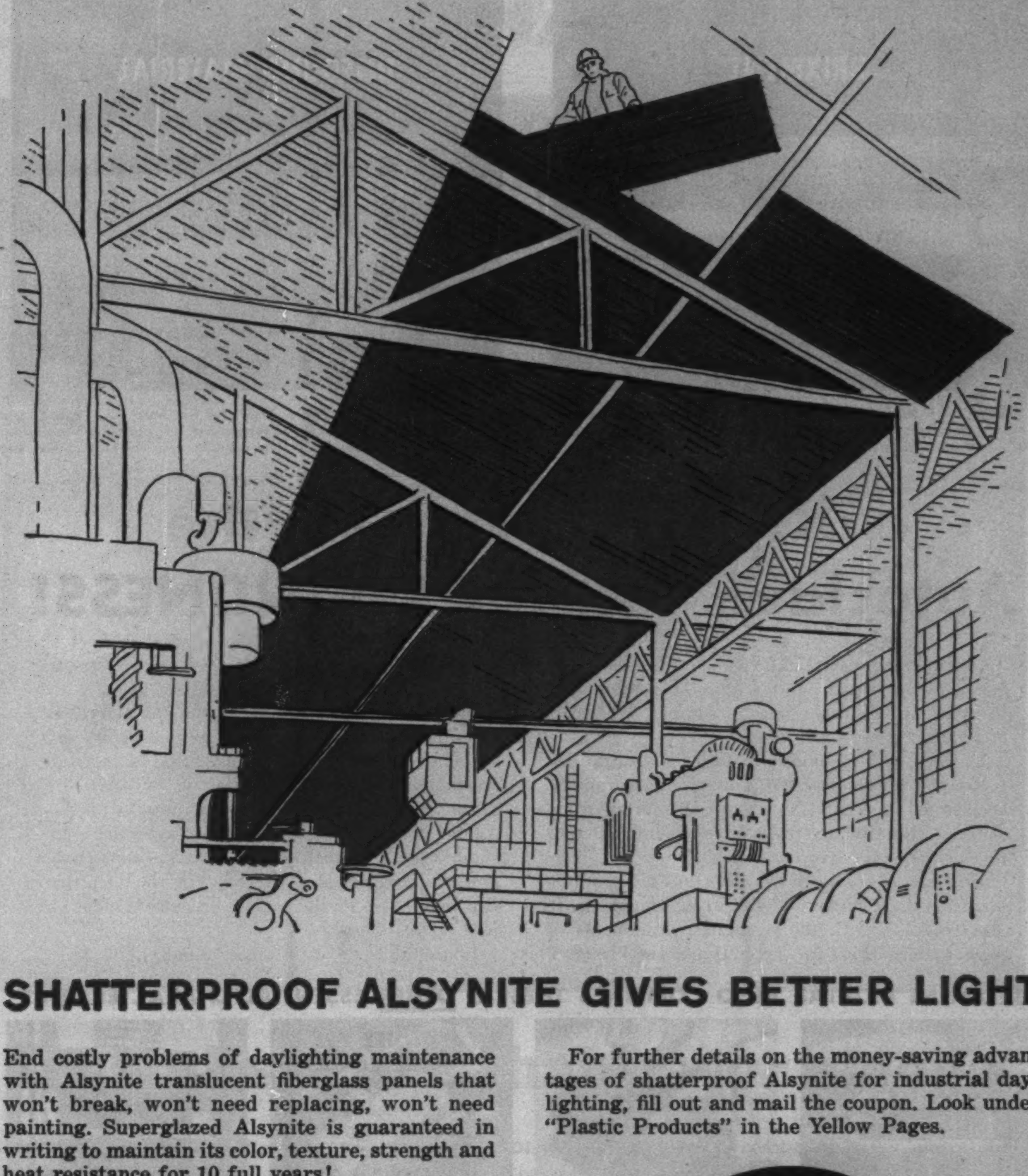
Released from the reservoir, the water drops through penstocks into scroll cases to fuel Tuscarora's turbine generators. From there it flows down the canal to Niagara Station to perform the same service. From Niagara Station the water is returned to the river.

ALLIED MATERIALS CORP.

PRODUCERS, REFINERS
AND COMPOUNDERS FOR
OVER 27 YEARS

ALLIED BUILDING • 5101 N. PENNSYLVANIA • P. O. BOX 7103 39th Street Station • Oklahoma City, Oklahoma
Plants: Stroud, Okla. • Detroit, Mich. • Los Angeles, Calif.

CIRCLE 38 ON READER SERVICE CARD



SHATTERPROOF ALSYNITE GIVES BETTER LIGHT

End costly problems of daylighting maintenance with Alsynite translucent fiberglass panels that won't break, won't need replacing, won't need painting. Superglazed Alsynite is guaranteed in writing to maintain its color, texture, strength and heat resistance for 10 full years!

End harsh glare, and with it the shadowed areas where most accidents and many costly errors occur. Alsynite diffuses the light, and cuts need for artificial lighting.

End costly installations. Alsynite corrugated panels nest with commonly used metal panels, handle like metal, require no expensive framing, no special handling, and can be nailed, sawed or drilled. Also available are Alsynite Flat Panes to fit standard window sash.

For further details on the money-saving advantages of shatterproof Alsynite for industrial daylighting, fill out and mail the coupon. Look under "Plastic Products" in the Yellow Pages.

Alsynite
FIBERGLASS PANELS

ALSYNITE COMPANY OF AMERICA, Dept. ENR-30, San Diego 9, Calif.

Send the full story on the advantages of Guaranteed Alsynite for industrial daylighting.

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COMPANY____________________

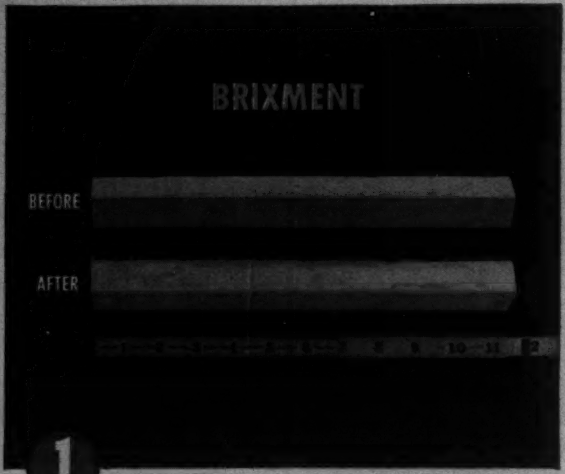
ADDRESS____________________

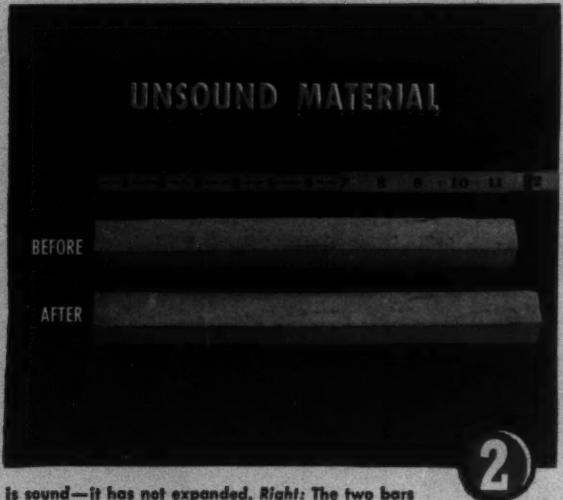
CITY________________ **STATE**__________

Plants in California, Ohio and New Jersey. Distributors in principal cities.

REGIONAL OFFICES: Albany, N.Y.; Atlanta, Ga.; Chicago; Columbus, O.; Denver; Houston; Kansas City, Mo.; Paterson, N.J.; St. Petersburg, Fla.; San Diego, Calif.; Seattle, Wash.

CIRCLE 39 ON READER SERVICE CARD





In these autoclave tests, the bottom bar in each set of neat cement bars above was exposed to 295 lbs. steam pressure, 420° F., for 3 hours. *Left:* The two bars are both Brixment. Note that it is sound—it has not expanded. *Right:* The two bars were made of one part portland cement and one part of a lime which does not meet autoclave test. Note expansion—proof of unsoundness.

BRIXMENT meets the Autoclave Test for SOUNDNESS!

Sound mortar is essential for strong, durable brickwork. To be sound, mortar must be free of constituents which may cause abnormal expansion after long exposure to weather.

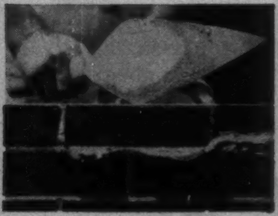
Unsoundness in mortar material is readily detected by the autoclave test. This severe test rapidly accelerates the chemical reaction of mortar materials, and the slightest unsoundness is immediately revealed by excessive expansion.

Brixment easily meets the autoclave test requirements of the Federal and ASTM specifications. It also complies with the strength requirements of both specifications for Type II masonry cement. Therefore, when Brixment is used, sound, strong, durable mortar is assured.

But soundness is only *one* of the characteristics in mortar necessary to produce top-quality masonry at lowest cost. Several others are listed below—and *no other mortar combines ALL these characteristics to such a high degree as Brixment mortar.* It is this combination of advantages that makes Brixment superior to any mixture of portland cement and lime—and which also accounts for the fact that Brixment has been the leading masonry cement for over 40 years.

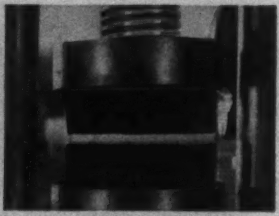
Louisville Cement Company, Louisville 2, Ky.

BRIXMENT MORTAR ALSO COMBINES THESE 8 OTHER ESSENTIAL CHARACTERISTICS

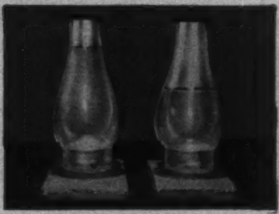

PLASTICITY

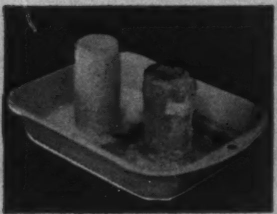
WATER RETENTION

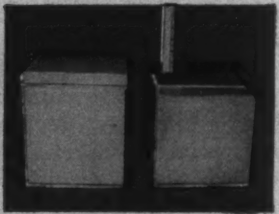
BOND


STRENGTH

LOW EFFLORESCENCE


IMPERMEABILITY


DURABILITY


YIELD

ALLIS-CHALMERS

Trail of service that never sleeps

Backing up the broad line of Allis-Chalmers products are more than 200 field installation and service men. Available day or night, they respond promptly to the emergency needs of A-C customers.

Hundreds of other facilities, strategically located, guarantee lifetime service support to Allis-Chalmers products wherever they are applied.

Regional offices are located in key industrial cities. **District offices** across the country cover every city or area wherever Allis-Chalmers equipment is used.

Certified service shops are only minutes away for expert round-the-clock service.

Warehouse stocks are within easy reach of all these service teams for fast delivery.

Ask your A-C representative about this coast-to-coast service organization, and the lifetime service support behind every A-C product, or write, call, or wire Allis-Chalmers, Milwaukee 1, Wisconsin.

"Teamed" Equipment from Allis-Chalmers — pumps, motors, motor-generators, motor control, condensers, blowers, hydraulic turbines and generators, water conditioning, transformers, switchgear, butterfly valves, diesel engines.

A-1213

CIRCLE 41 ON READER SERVICE CARD

HEAVY DUTY ¾-YARD SHOVEL is fast, rugged, a real profit-maker. Two-lever, "Joy-Stick" controls are available to speed operations. Choice of three crawlers. Boom is all welded with cable crowd, power dipper trip.

VERSATILE 18-TON CRANE with simple, precision controls. Exclusive square-tubular-chord boom boosts payloads. Simultaneous swing, hoist and travel available. Crane converts to dragline, clamshell, shovel or hoe.

LORAIN 26: FAST WAY TO MAKE A FAST BUCK

HARD DIGGING HOE has the weight for forceful "crowding" . . . the stability and power to work toughest materials. Long, gooseneck boom permits maximum digging ranges. All control linkage on anti-friction bearings.

DRAGLINE AND CLAMSHELL have long life, swing clutches for fast action. Hoist drums are mounted on anti-friction bearings. Big crawlers give super-flotation. Lighter, stronger boom increases bucket reaches.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN. ON THE MOVE

PLANTS: In Lorain, Elyria and Bucyrus, Ohio . . . **PRODUCTS:** Power shovels, cranes, draglines, clamshell, and hoes on crawlers from ⅜- to 2½-yard capacity • Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes • Rubber tire front-end Moto-Loaders in 6000-lb. and 7000-lb. carrying capacity . . . **OUTLETS:** Lorain products sold and serviced by 249 distributor outlets throughout the world.

ALLIS-CHALMERS

One of three 96-inch Howell-Bunger valves in operation at the U. S. Engineers Mud Mountain Dam, White River, Wash.

2 ways to air-cushion a big splash

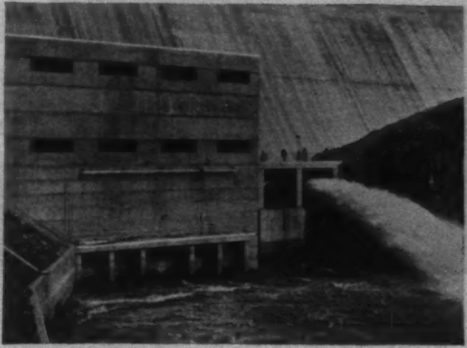
...and provide easy regulation of free discharge

Howell-Bunger valves produce an expanding, aerated water jet that dissipates tremendous energy with minimum erosion and cavitation — and virtually no vibration. They're ideal for free discharge with high to low heads, into atmosphere or water. Lowest in initial cost... economical to install (need pipe line or conduit of *minimum* size). Only one moving part in contact with flow.

Ring-Jet valves yield a concentrated, aerated jet, perfect for locations requiring reduced spray. A logical development from the *Howell-Bunger* valve, they offer many parallel advantages ... are equally suited to high and low heads.

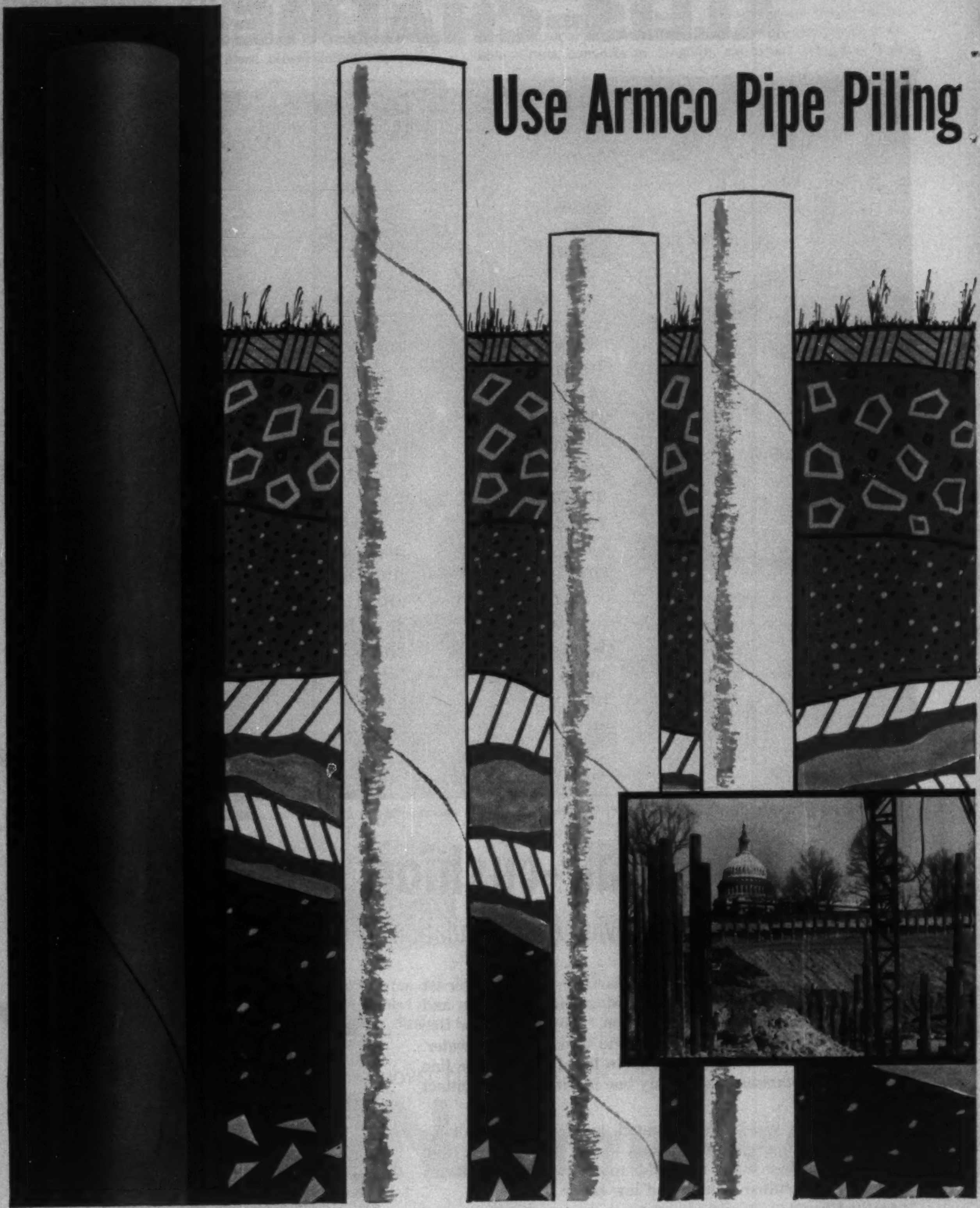
Only Allis-Chalmers is geared to equip complete hydro installations — turbines, generators and auxiliaries. Contact our office in your area for information. Or write ***Allis-Chalmers,*** *Hydraulic Division, York, Pennsylvania.*

A-1256



One of two RING JET valves used for irrigation bypass from Tulloch Dam, California.

Use Armco Pipe Piling



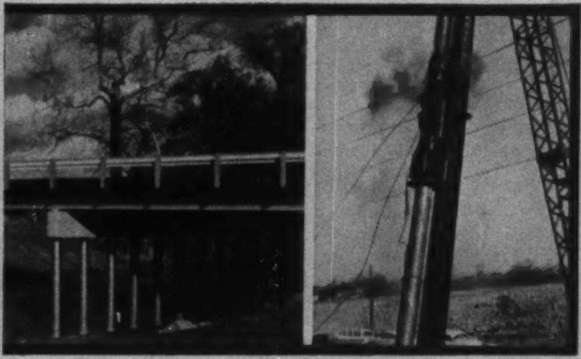
...You can check it where it counts most

IN THE GROUND

When you specify and use Armco Steel Pipe Piling, you'll find advantages that no other type of foundation product can deliver. *After it's in the ground,* you can make a quick, sure check for alignment and watertightness. A light or reflector lets you see all the way to the bottom. You *know* where each pile goes—no doubt about it.

You can get Armco Pipe Piling in 132 different diameter-wall thickness combinations. Lengths are practically unlimited. In addition, you can meet foundation pipe needs from lightweight Armco HEL-COR® Pile Shells. These shells are available in diameters from 10⅝" to 22". Thus, it is an easy matter to specify an Armco Foundation Pipe that meets your *exact* requirements. Get details now. Send coupon for 16-page catalog on Armco Foundation Products. Armco Drainage & Metal Products, Inc., 5670 Curtis Street, Middletown, Ohio.

New steels are born at Armco



ARMCO DRAINAGE & METAL PRODUCTS, INC.
Department E
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Send your catalog on Armco Foundation Products

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City__________ Zone____ State______

ARMCO DRAINAGE & METAL PRODUCTS

Subsidiary of ARMCO STEEL CORPORATION

OTHER SUBSIDIARIES AND DIVISIONS: Armco Division • Sheffield Division • The National Supply Company • The Armco International Corporation • Union Wire Rope Corporation

CIRCLE 45 ON READER SERVICE CARD

1.* DAYLIGHTING DO's and DON'Ts

FOR PROGRESSIVE ENGINEERS

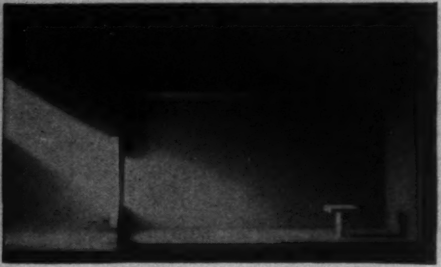
* No. 1 of a series to help Engineers increase plant efficiency and economy.

DON'T expect maximum daylighting value from just any glazing medium

In good industrial daylighting practice, the problem is to provide enough light at working levels distant from the windows while avoiding a high concentration of lighting next to windows. To accomplish this uniformity of lighting, some diffusion must be employed to throw a portion of the available light directly to the far side of the room.

Translucent light diffusing glass by Mississippi is "Visioneered" for better daylighting, scientifically designed to distribute light to best advantage. Furnished wired and unwired in a variety of industrial patterns and surface finishes, Mississippi rolled glass is available at leading distributors of quality glass.

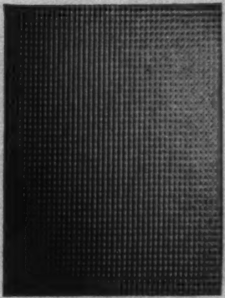
Photograph shows "Smoke Box Room" with its window glazed with clear glass.



Smoke Box photo showing window glazed with a diffusing glass.

DO INSIST ON GLASS FOR GLAZING

In buildings new or old, glass and glass alone possesses the desirable characteristics of chemical stability, permanence of finish, color, shape, surface hardness and noninflammability. Buy, specify, insist on glass. See your Mississippi Glass distributor.



Send for new free 1960 catalog. Address Department 20.

MISSISSIPPI GLASS COMPANY
88 Angelica St. • St. Louis 7, Missouri
NEW YORK • CHICAGO • FULLERTON, CALIFORNIA

SEE OUR CATALOG IN SWEETS OR WRITE FOR COPY

WORLD'S LARGEST MANUFACTURER OF ROLLED, FIGURED AND WIRED GLASS

design, inspection and equally good execution—there should be complete coverage of reinforcing with non-corrosive material. But depending on the workmanship, there is too frequently a large difference between "should" in design and "would" in construction.

In a beam built up of precast sections, the joints between units must be liquid tight and holes through the sections completely filled surrounding the reinforcing with grout.

But with post-tensioning what insures that grout fills every cranny?

And with pretensioning what insures that concrete fills all cavities under rods?

Further, if a beam is in salt water, and concrete is not sufficiently dense, what will stop corrosion of the reinforcing?

I believe that my implication is correct, that prestressed concrete work requires careful inspection—and maintenance when defects are noted.

George R. Wadleigh
Hastings-on-Hudson, N. Y.

Explains Survey School

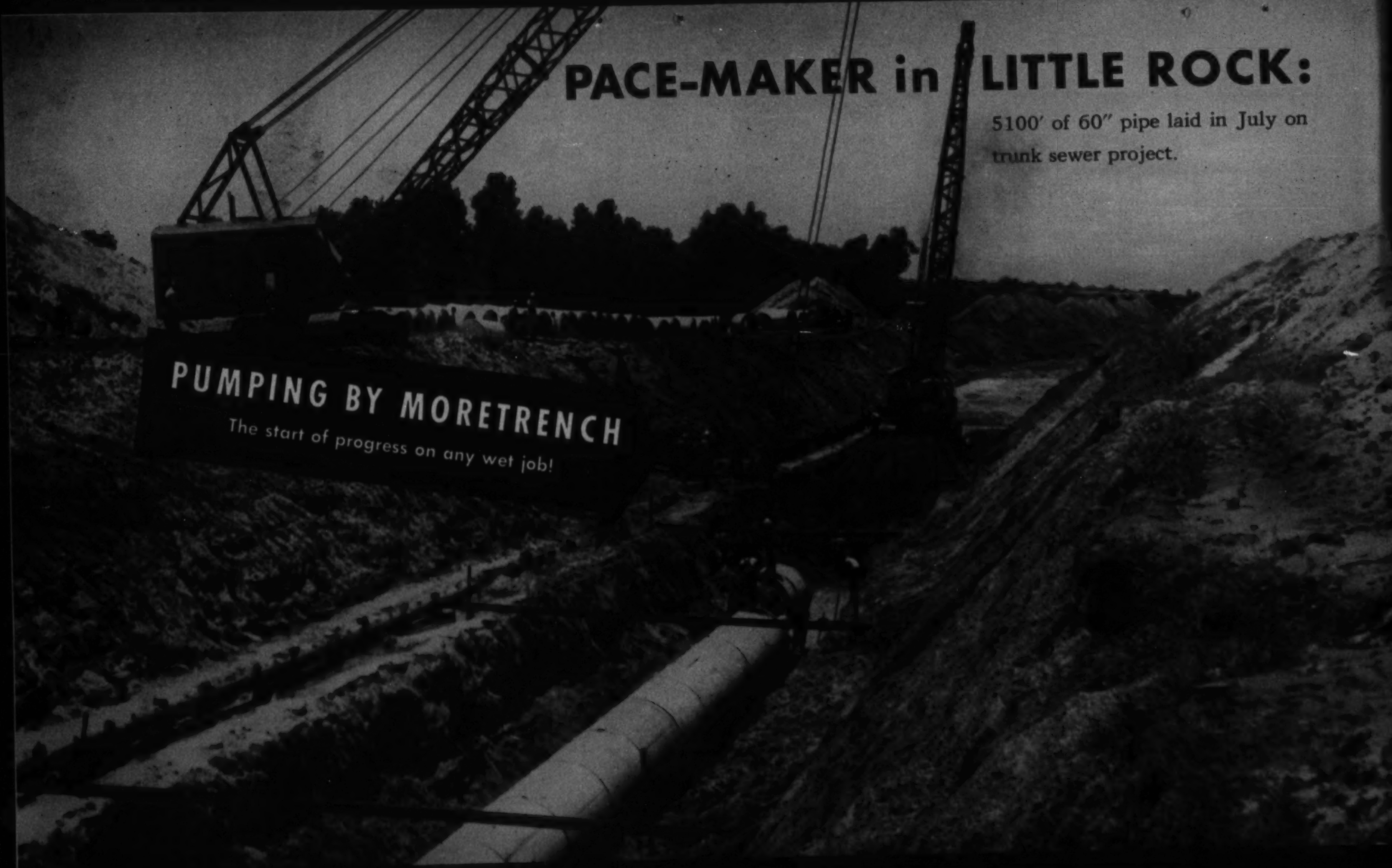
Sir—Concerning the article "Training Setup for Surveyors" (ENR, Jan. 28, p. 191), it should be explained that this is only a technician training program for field men.

It is not intended to educate men for the licensing examination. Surveyor licensing in California is open to people who have had six years of experience, or the equivalent in education and experience, above the grade of party chief. The licensing examination covers material at college level such as spherical trigonometry, analytical and descriptive geometry, astronomy, geodesy and legal aspects of surveying.

The California Council of Civil Engineers and Land Surveyors did not participate in setting up the program. A member of the California Council, the Civil Engineers and Land Surveyors Association of California, inaugurated the program working in conjunction with the International Union of Operating Engineers, Local 12D. Other member associations in the California Council have discussed setting up the program jointly with the particular union with which they contract for their labor. There are five different unions in California with which member associations of the Council have labor contracts; three of them are AFL-CIO. It appears very likely that the other members of the Council will follow the lead of the California Association. An adequate supply of competent field technicians can only be obtained by training them on the job. And cooperation with the unions is necessary to make the programs work.

William A. White
California Council of Civil Engineers
and Land Surveyors
Sacramento, Calif.

(Reader Comment continued p. 52)



PACE-MAKER in LITTLE ROCK:

5100′ of 60″ pipe laid in July on trunk sewer project.

PUMPING BY MORETRENCH

The start of progress on any wet job!

MORETRENCH CORPORATION

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WESTERN REPRESENTATIVE: Andrews Machinery of Washington, Inc., Seattle 4, Washington
CANADIAN REPRESENTATIVE: Geo. W. Crothers Limited, Toronto, Ontario
BRAZILIAN REPRESENTATIVE: Oscar Taves & Co., Ltd., Rio de Janeiro

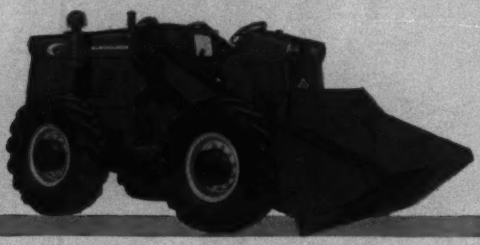
LIKE A LOADER WITH EXTRA REACH?

The TL-20 has it! Means fast, even dumping into high-sided trucks—no wasting time leveling material to distribute it evenly.

That extra foot or two of reach that you get with a TL-20 tractor loader makes a big difference in your output. You clip valuable seconds from work cycles by dumping loads right into the center of high-body trucks. No time-consuming loading from both sides . . . no pitching . . . no wasting time dozing to distribute material evenly—and no banging up truck and loader.

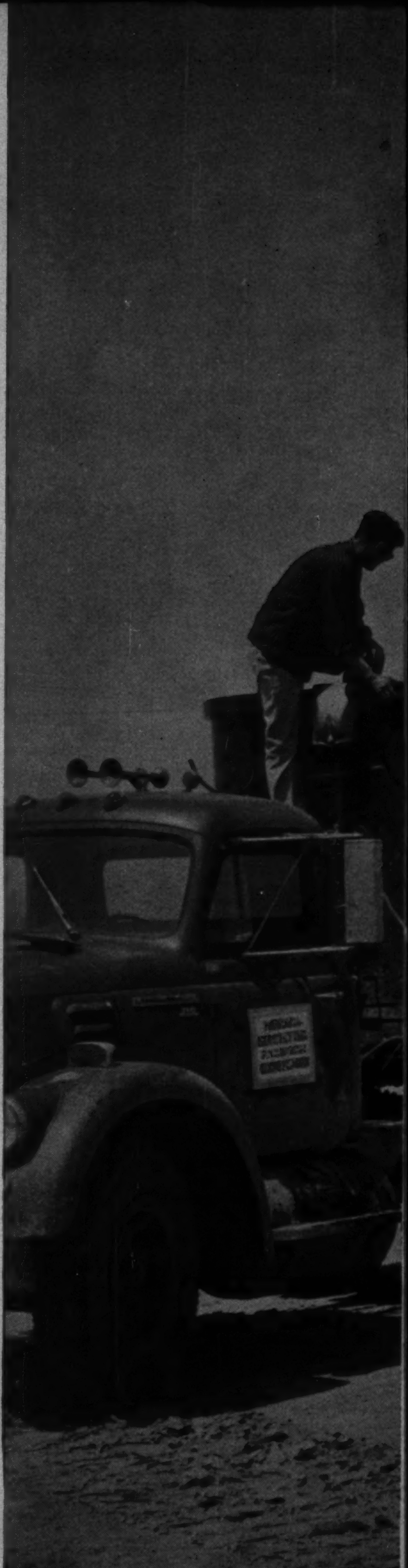
Other exclusive advantages include: *Faster Shifting*—one lever controls both forward-reverse and all speeds. *Greater Stability*—easier loading, less spillage, more operator comfort. *Strong, Pin-Connected Axles* prevent rolling and shifting of axles under load. Your Allis-Chalmers dealer can show you other tractor loader advantages that bring extra production on excavating and loading work. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

TL-20—6 buckets, from 2¼ to 5 cu yd • 130-hp diesel • 23,250 lb • 9,000-lb. carry capacity



move ahead with
ALLIS-CHALMERS
power for a growing world

CIRCLE 49 ON READER SERVICE CARD



ALLIS-CHALMERS
TL 20

OKLAHOMA PROJECT I-205 (5) Interstate Route 40

Oklahoma builds to last...with "DEEP-STRENGTH" Asphalt pavement

•Hot-mixed—hot-laid Asphalt base promises outstanding service life.

•Design overcomes problems of plastic subsoil and short aggregate supply.

Down in Oklahoma, they've just completed a beauty . . . a new *Deep-Strength* Asphalt pavement that includes many features of The Asphalt Institute's Advanced Design Criteria.

And it won't be the last. That's for sure.

Just take a look at the construction (right) and cross section (below). Notice that precepts of new *Deep-Strength* Asphalt design are incorporated...heavy-duty Asphalt concrete surface course . . . heavy-duty Asphalt base . . . Asphalt primed subbase . . . wide double-sealed Asphalt shoulders (on Asphalt base) . . . heavy compaction . . . good drainage.

When designed like this — for *Deep-Strength* . . . Asphalt pavements will carry the heaviest traffic loads without distress . . . with minimum maintenance cost. Witness the New Jersey Turnpike. Witness also *Deep-Strength* Asphalt city pavements built more than 60 years ago and still in service.

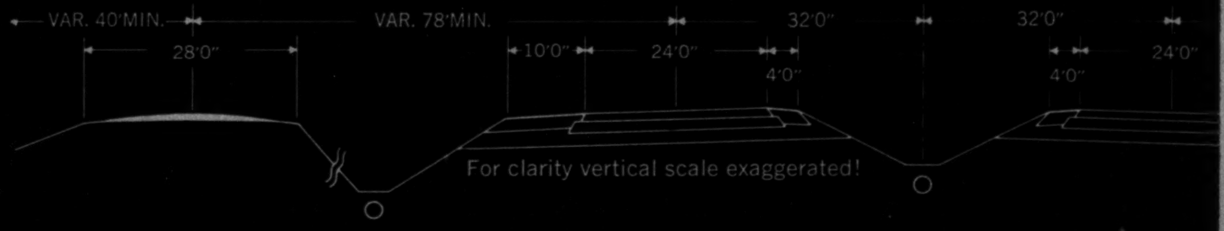
Save money, too

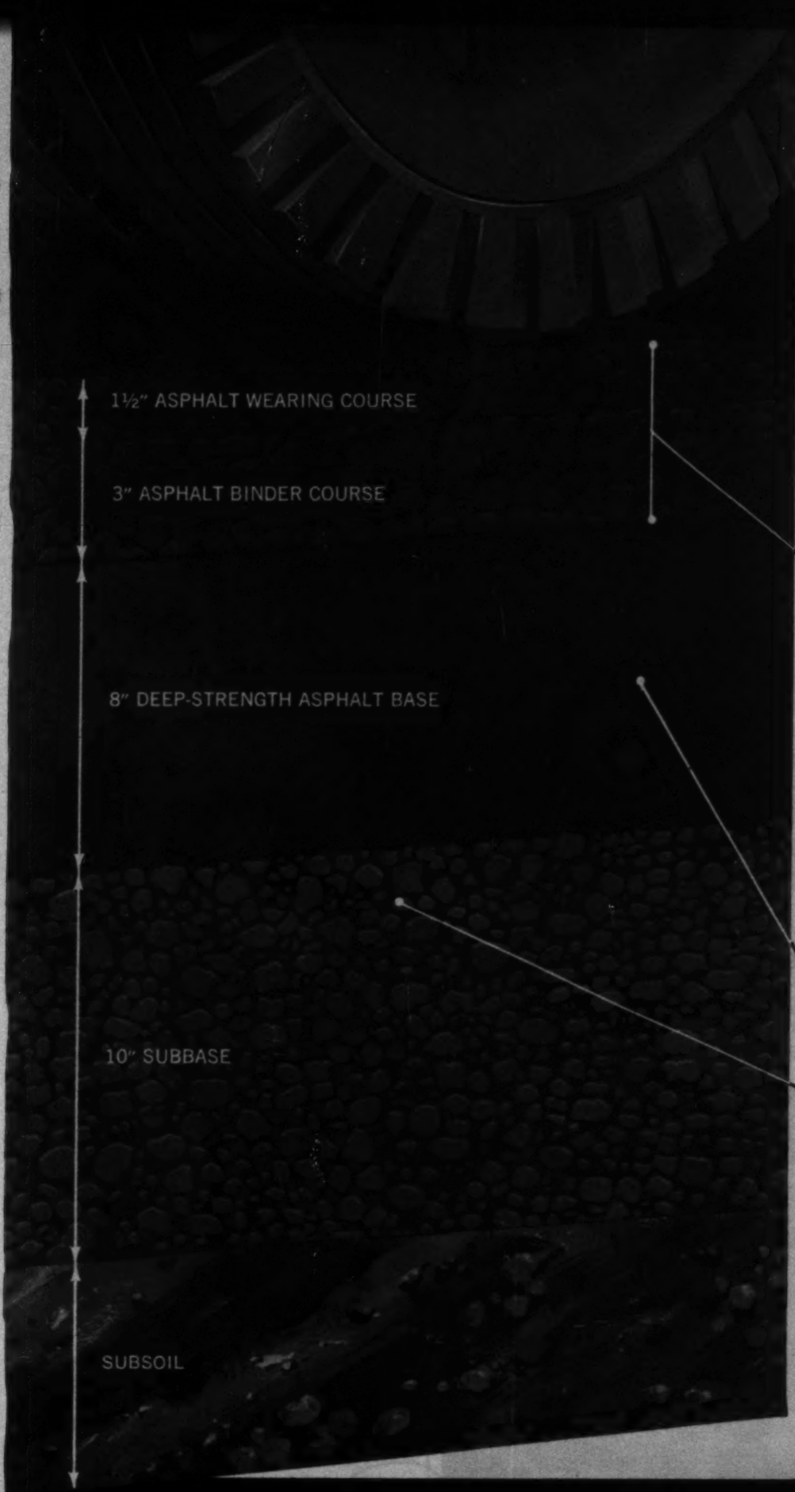
Surprising as it seems at first glance, modern low-maintenance, *Deep-Strength* Asphalt pavements often cost less to build than Asphalt pavements designed to other standards. That's because the Advanced Design Criteria permit inexpensive Asphalt base to be substituted, within limits, for the more expensive Asphalt concrete surfacing. And also because total pavement thickness can often be reduced by several inches.

New Handbook

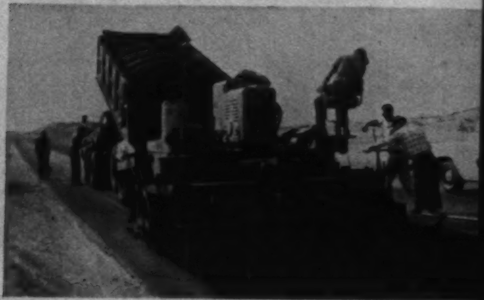
Now on the presses is a new edition of The Asphalt Handbook. It incorporates all the Advanced Design Criteria for highways implied by the term *Deep-Strength* Asphalt Construction. Copies soon will be available at The Asphalt Institute office serving your area.

DEPRESSED MEDIANS ASSIST FREE DRAINING. Note also the Asphalt shoulder construction. These two measures alone can substantiall




1½" ASPHALT WEARING COURSE
3" ASPHALT BINDER COURSE
8" DEEP-STRENGTH ASPHALT BASE
10" SUBBASE
SUBSOIL

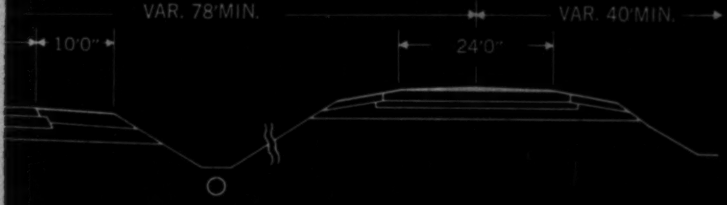
4½-INCH ASPHALT CONCRETE SURFACE takes heaviest traffic, deicing salts without distress. Lane markings show up better day or night, wet or dry.



8-INCH SAND-ASPHALT BASE provides Deep-Strength . . . excludes moisture, insures smoother riding surface under heaviest traffic.

ASPHALT PRIME COAT SEALS SUBBASE . . . insures bond with overlying Asphalt base.

lengthen pavement life.


VAR. 78'MIN.
VAR. 40'MIN.
10'0"
24'0"

DEEP-STRENGTH

Ribbons of velvet smoothness . . .
ASPHALT paved Interstate Highways.

THE ASPHALT INSTITUTE
Asphalt Institute Building, College Park, Maryland

Alarm on Interstate

Sir—Your report on new Interstate Highway standards (ENR Feb. 11, p. 21) appears to be the most alarming news concerning this program.

Does anyone really believe we can say 400,000 people need four lanes and a million people need eight lanes or that interchanges should average two miles apart regardless of existing street pattern and population and traffic densities? In your same issue you editorialized favorably on the Highway Research Board proposal for an urban research council, and with that I agree wholeheartedly. I presume you know that the same conference spent many hours discussing methods of estimating and projecting highway traffic and highway needs. I assure you none of them were as simple as the standards you have reported.

The new standards are obviously an attempt to economize. Economy is always a sound engineering objective provided it doesn't produce inadequacy. Those who have had experience with underdesigned expressways or even merely ridden on them know that they are a worse horror than a congested street system that they purported to replace. If we must save money, let's face the reality and shorten the system by eliminating many of the thousands of miles that may never require even the minimum capacity inherently available in the limited access system. In our enthusiasm to get finished by an arbitrarily chosen date, we seem to have lost sight of the simple fact that extension of an existing adequate system is virtually no problem, whereas increasing the capacity of underbuilt sections will be virtually impossible.

William R. McGrath
Director
Department of Traffic & Parking
New Haven, Conn.

Garbled Geography

Sir—As a former Bureau of Reclamation engineer and former resident of Boulder, Colo., I would like to note a glaring (but common) error in ENR's "Construction Week," Feb. 18, p. 21.

The USBR headquarters for Hoover Dam was located not in Boulder, Colo., but in Boulder City, Nev. Perhaps the fact that Hoover Dam is on the Colorado River adds to the confusion.

W. J. Venuti
Associate Professor
Department of Civil Engineering
San Jose State College
San Jose, Calif.

▶ Tourists inquiring in Boulder, Colo., about the location of Hoover Dam are told, "Turn left and go southwest about 1,000 miles."

W. C. Light
Director of Public Service
Boulder, Colo.

(Reader Comment continued p. 55)

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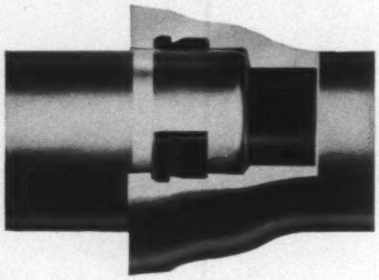

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For Your Calendar . . .

Uses and Applications of Electronic Computers in the Field of Civil Engineering, University of Wisconsin Extension Division, Wisconsin Center Building, Madison, Wisc., Mar. 31-Apr. 1. Write: Engineering Institute, 3030 Stadium, University Extension, University of Wisconsin, Madison 6.

1960 Nuclear Congress and Atomic Exposition, New York Coliseum, New York, N. Y., Apr. 4-7. Write: Atomic Exposition, 117 South 17th St., Philadelphia 3, Pa.

Building Research Institute, spring conference, Statler-Hilton Hotel, New York, N. Y., Apr. 5-7. Write: Milton C. Coon Jr., BRI executive director, 2101 Constitution Ave., N. W., Washington 25, D. C.

Oil Heat Institute of America, annual convention, Park-Sheraton Hotel, New York, N. Y., Apr. 4-7. Write: Oil Heat Institute of America, Inc., 500 Fifth Ave., New York 36, N. Y.

Society of Automotive Engineers, Inc., annual earthmoving industry conference, Pere Marquette Hotel, Peoria, Ill., Apr. 5-6. Write: Earthmoving Industry Conference, Box 973, Peoria, Ill.

Arizona Consulting Engineers Association, annual meeting, Westward Ho Hotel, Phoenix, Ariz., April 12.

Malleable Founders Society, market development conference, Edgewater Beach Hotel, Chicago, Ill., Apr. 13-14. Write: Malleable Founders Society, 781 Union Commerce Building, Cleveland 14, Ohio.

American Institute of Architects, annual convention, Mark Hopkins Hotel and Masonic Temple, San Francisco, Calif., Apr. 18-22. Write: American Institute of Architects, 1735 New York Ave., N. W., Washington, D. C.

Church Design and Building Conference and Exposition, Morrison Hotel, Chicago, Ill., Apr. 19-21. Write: Rev. T. V. L. Harvey, 19 South LaSalle St., Chicago 3, Ill.

Third Biological Waste Treatment Conference, Manhattan College, New York, N. Y., Apr. 20-22. Write: Civil Engineering Dept., Manhattan College, New York 71, N. Y.

National Terrazzo and Mosaic Association, annual meeting, St. Francis Hotel, San Francisco, Calif., Apr. 25-28. Write: National Terrazzo and Mosaic Association, Manufacturers Division, 711 14th St., N. W., Washington 5, D. C.

Southwestern Metal Exposition & Congress, State Fair Park, Automobile Building, Dallas, Tex., Apr. 25-29. Write: Chester L. Wells, Exposition Manager, American Society for Metals, 7301 Euclid Ave., Cleveland 3, Ohio.

Construction Specifications Institute, annual meeting, Palo Alto, Calif., Apr. 25-27. Write: Construction Specifications Institute, 632 Dupont Circle Building, Washington 6, D. C.

American Welding Society, annual convention and show, Great Western Exhibit Center, Los Angeles, Calif., Apr. 25-29. Write: American Welding Society, 33 West 39th St., New York 18, N. Y.

Purdue Industrial Waste Conference, Purdue University, Lafayette, Ind., May 3-5. Write: Prof. Don E. Bloodgood, Purdue University School of Civil Engineering, Lafayette, Ind.

Western Public Works Conference and Equipment Show, Fresno, Calif., May 16-18. Write: American Public Works Association, Central California Chapter, 401 W. Main Street, Visalia, Calif.

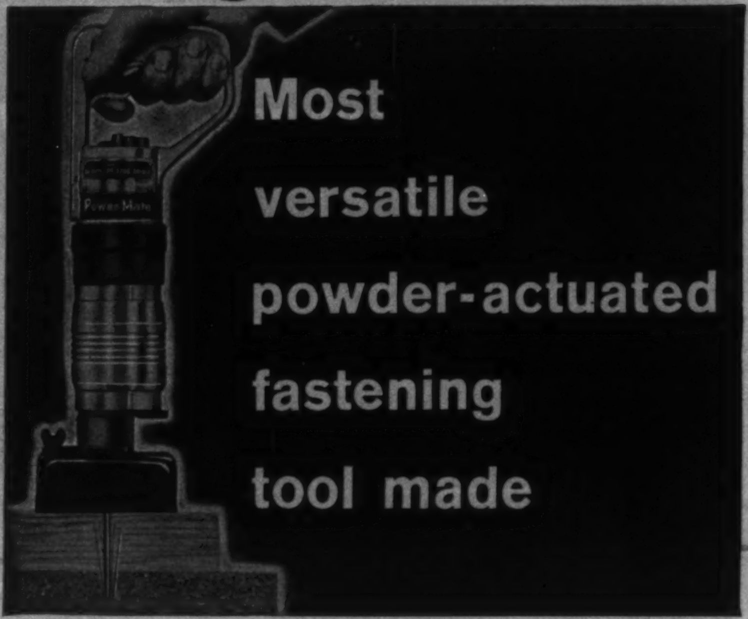
Society for Experimental Stress Analysis, spring meeting, Hotel Severin, Indianapolis, Ind., May 18-20. Write: Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Mass.

International Public Works and Building Equipment Exhibition, Paris, France, May 19-29. Write: Manager, International Public Works and Building Equipment Exhibition, 1, Avenue Niel, Paris XVII, France.

Pan American Highway Congress, Bogota, Colombia, May 20-29. Write: Organizing Committee, VIII Pan American Highway Congress, Ministry of Public Works, Bogota, Colombia.

Design Engineering Show, New York Coliseum, New York, N. Y., May 23-26. Write: Clapp & Poliak, Inc., 341 Madison Ave., New York 17, N. Y.

Remington Stud Driver



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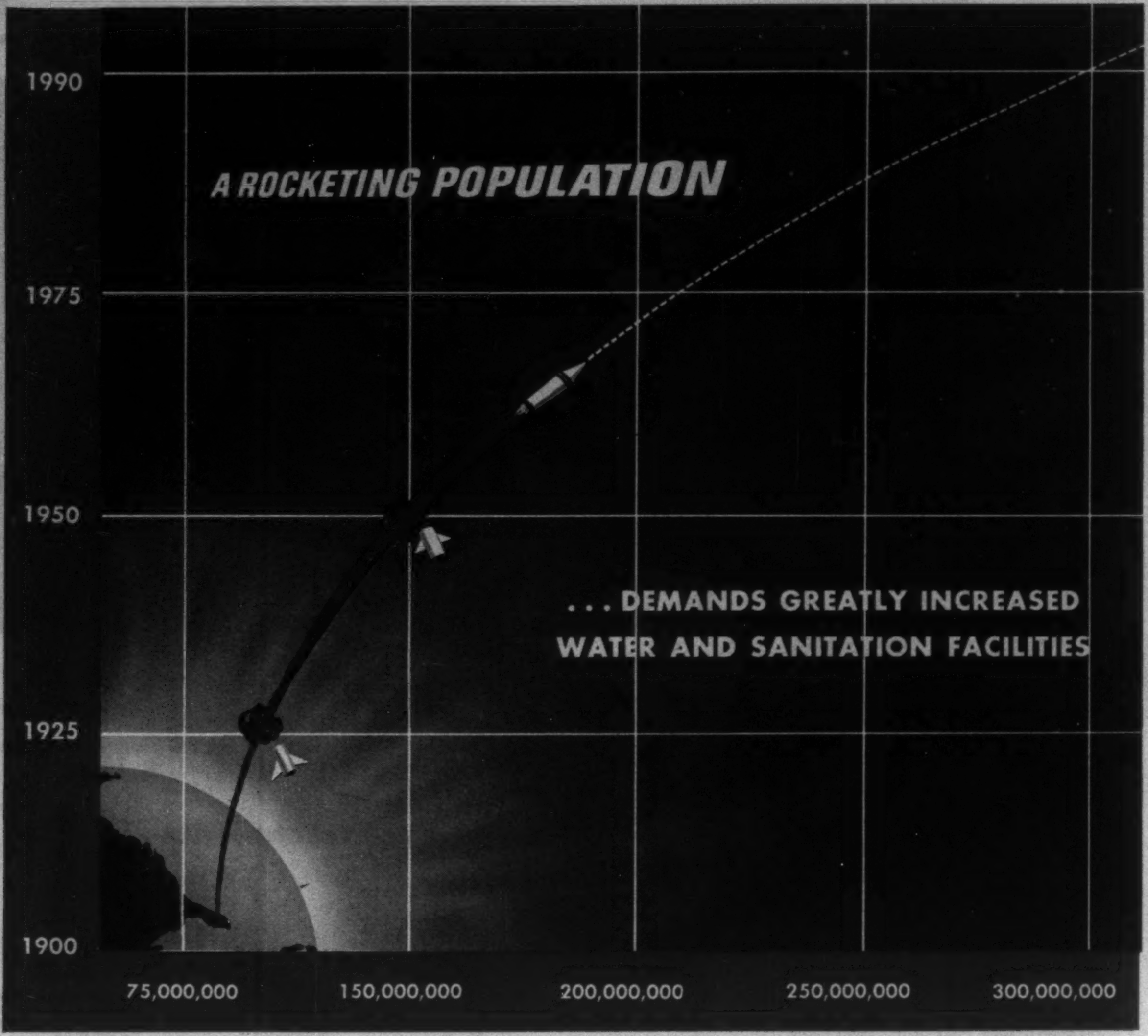

Growth of U.S. Population in Millions:

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And proportionate demands on water and sanitary facilities are increasing even more rapidly because of industry's ever-growing need for water supply and waste disposal.

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Back issues of ENGINEERING NEWS-RECORD *are generally available for the previous six months. Semiannual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in Industrial Arts Index and Engineering Index.*

THE CONSTRUCTION WEEK

A BREAK FOR YOUR POCKET—Bucyrus-Erie Co. has slashed price tags by 15 to 17% on its 2½- to 5-cu yd bucket lines and Mack Truck Co. has chipped 4% off the price of its LYSW off-highway dump truck. Both companies credit the cuts to redesign economies. The actions are in contrast to selective price boosts announced recently by other manufacturers.

MISSION TO MOROCCO—Four U.S. experts in earthquake-force design are investigating the structural damage of the Agadir earthquake. They will consult with Moroccan officials on the design of structures in the Agadir rebuilding program. The four experts: T. R. Higgins of American Institute of Steel Construction; W. G. Kirkland of American Iron & Steel Institute; Prof. Ray Clough of the University of California, and R. W. Binder of Bethlehem Steel Co.

GNOME TUNNEL TO START—With a wary eye on Geneva, the Atomic Energy Commission is starting a 1,200-ft-deep shaft and a 1,100-ft-long tunnel for Project Gnome—an underground nuclear blast in the salt beds near Carlsbad, N. M., to explore the possibilities of converting heat from the explosion into kilowatts. But an agreement at Geneva on banning atomic tests could change the AEC's plans.

THE PLUMBERS PULL OUT—As an aftermath of a labor feud over the construction industry's efforts to obtain more maintenance work under the contract method, the plumbers union will withdraw from the AFL-CIO Industrial Union Department, effective March 31. Plumber president Peter T. Schoeman says he wants to free the IUD from the "embarrassment" of discussing building trades' matters in "my presence."

SCIENCE IS "FRILLS?"—Science laboratories and foreign-language instruction rooms are classed as "frills" under the Delaware Board of Education's just-revised school construction cost formula. If school districts want those facilities they'll have to pay the full bill.

OFF THE TRACK?—A $5-million, one-mile monorail from Seattle's downtown to the site of a proposed international exposition is stalled for lack of financing. Lockheed Aircraft Corp., was named prime design and construction contractor for the unit last year. Now the city's Transit Commission has rejected that company's financing plan. The commission is dickering with a Swedish firm for financing and construction.

THIS IS FLOOD CONTROL?—Collapse of a 6-ft-high dam in the wake of high water and torrential rains in Tampa, Fla., may not have been an accident. A Hillsborough County commissioner suspects that residents above the dam sabotaged the flood-control structure trying to slow the rising waters in their area.

Construction progress on the Oneida Lake Bridge. Owner: State of New York Department of Public Works (C. F. Blanchard, Deputy Chief Engineer, Bridges). Engineers: Summers, Munninger and Molke, Albany, New York. General Contractor: All construction work performed by Terry Contracting, Inc., Long Island City, New York.

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Concrete Span

. . . another outstanding example of Ryerson post-tensioning service

The longest post-tensioned concrete bridge span in the nation—for that matter the longest in this hemisphere—is the 320-foot center span of the Oneida Lake Bridge now being built near Brewerton, New York.

The entire structure, extending 460 feet between abutments, contains 34 post-tensioned concrete girders—all cast on the job site. Two dozen are 146-foot cantilever girders, each weighing 240 tons . . . ten are 231-foot drop-in girders weighing 230 tons apiece.

The post-tensioning "package" of materials and equipment delivered to Terry by Ryerson included more than a thousand tendon and anchorage assemblies, each containing 12 to 28 ¼-inch cold drawn, stress relieved wires, plus stressing and grouting equipment—and 400 tons of fabricated re-bars.

Another unique feature of the bridge: it will be practically maintenance free because of its concrete girders, its stainless steel bearing plates and anchor bolts, and its aluminum railings.

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WASHINGTON OBSERVER

- **Nike-Zeus construction stepped up**
- **Keogh bill delayed**
- **Savage for Slusser at HHFA**

● **Construction activity on the Army's Nike-Zeus anti-missile missile project is going into higher gear.** Over the next few months the Army plans to award about $31 million worth of new contracts. This will bring the total construction commitment to $61 million.

Contracts amounting to $20 million will be let this spring for work on Johnston Island, a Pacific flyspeck some 500 miles southwest of Hawaii. Dredging operations on the island are now about 40% complete. The new construction will go for erection of Jupiter IRBM launch pads and instrumentation facilities.

Some time in late 1962 the Army plans to launch a Jupiter missile from Johnston westward as an intercept target for a Nike-Zeus to be fired from Kwajalein.

At Kwajalein, about 1,400 miles to the southwest, some $10 million worth of contracts will be let by June 30. This is in addition to $13 million worth of construction already under way for rebuilding of nuclear test structures and construction of power plants and "technical buildings." This work is about 18% completed. The additional sum will go for the erection of a Nike-Zeus complex—launch pads, radar installations and the like.

Additional Nike-Zeus test facility construction is under way at Point Mugu, Calif., and Ascension Island in the south Atlantic. The California site will be used to test launch the missile. Prototype Zeus radars will be installed at Ascension to test track missiles fired from Cape Canaveral.

The fiscal 1961 defense budget contains an additional $15-million fund for completion of Zeus test facilities. An Army plea for $389 million to begin construction of operational Zeus bases and for funds to build Zeus production facilities was turned down by the Administration.

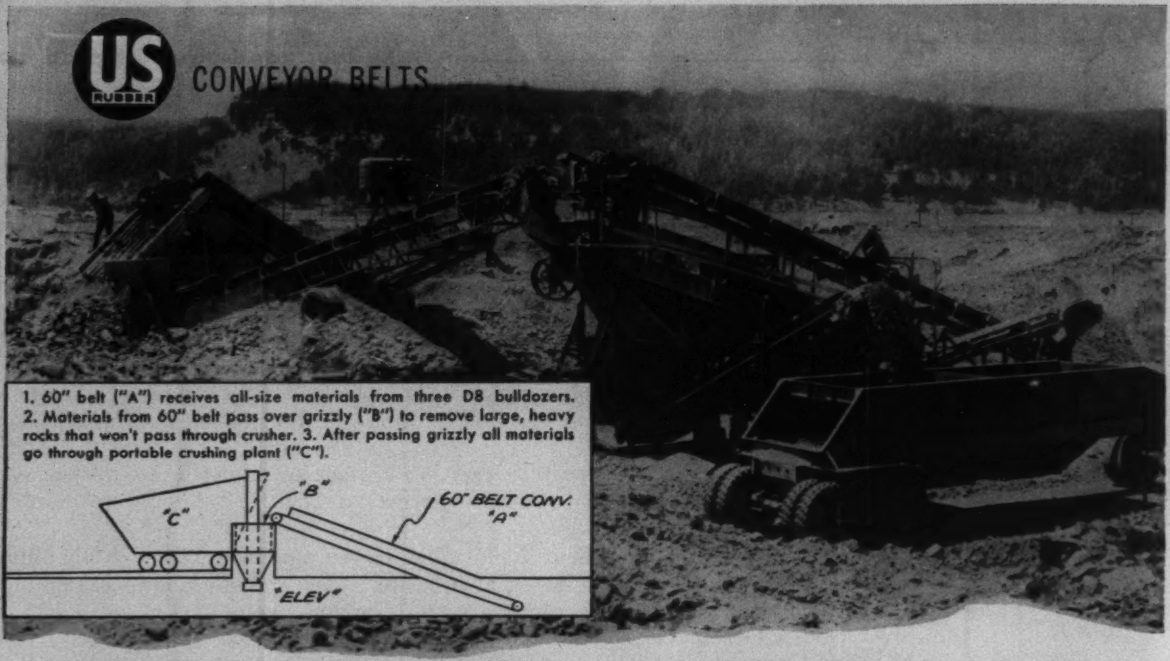
—

● **The Keogh bill, which gives tax credits to self-employed who buy retirement insurance, is bogged down in the Senate Finance Committee.** Action is being delayed until the Treasury Department, which opposes the legislation, comes up with a substitute. The delay may require putting off consideration until next year.

The bill would permit professionals, such as engineers and contractors, to take a tax deduction of up to $2,500 a year to be set aside for buying a government-approved pension. It's been approved in the House, but the Treasury fears the legislation would give too much benefit to too few people.

—

● **Bruce Savage, former Republican Representative of Indianapolis, was appointed Public Housing Commissioner this week.** President Eisenhower nominated him to succeed Charles E. Slusser, who resigned. The Senate still must confirm the nomination.



1. 60" belt ("A") receives all-size materials from three D8 bulldozers. 2. Materials from 60" belt pass over grizzly ("B") to remove large, heavy rocks that won't pass through crusher. 3. After passing grizzly all materials go through portable crushing plant ("C").

Conveyor equipped with U.S. Matchless Belt increased production from 175 tons to 300 tons per hour

Such records as this have made U.S. Rubber the world's largest producer of conveyor belts.

In this instance the "U. S." Belt helped increase production at the Carlson-Lien Company (Piedmont, S.D.), a supply firm currently producing road-building crushed rock and delivering it to highway projects. The belt is 60" wide, 35 feet from center to center (78 feet overall). "Our intention," says Bruce Lien, company secretary-treasurer, "is to replace all belts with U. S. Rubber Belts."

In this operation, bulldozers push the rocks to be processed into the loading point. The conveyor belt then carries this material to the grizzly. The belt was designed to withstand direct loading by bulldozers. The impact of the large rocks falling directly on the belt does not damage the conveyor system. This permits the grizzly to be placed at the discharge end of the conveyor instead of at the feed point as in conventional installations.

The superiority of this belt not only helped speed up and increase production, but also eliminated the need for three or four men to laboriously remove large rocks that would damage a belt of inferior quality. The "U. S." Belt proved so efficient in tons moved per hour that another bulldozer was added to keep the loading pit stocked with raw materials. "The belt will pay for itself on this one job. We recommend it to anyone," says Bruce Lien.

• • •

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Close-up of 60" U. S. Matchless® Belt carrying rocks from raw material pit up incline to crusher.

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CIRCLE 60 ON READER SERVICE CARD

The More We Know, the Less We Know

- **Research findings reported to the American Concrete Institute stress the need for more research—and the money to do it.**
- **Case in point is a forthcoming formula for web reinforcement: Though based on best information available, it's not fully satisfactory.**

The construction industry still is not doing enough research. That assertion was made last week at the 56th annual meeting of the American Concrete Institute in New York City. Though ACI is noted for its research efforts, retiring president Prof. Phil M. Ferguson of the University of Texas calls them still inadequate.

The same complaint is evident at many technical society meetings. It indicates how seriously industry leaders view the slow progress being made in solving current engineering problems and in developing new methods and materials.

"In comparison to the need, very small efforts and very small funds are being directed toward research," says Professor Ferguson. "The chemical industry finds it a good investment to put from 1% to 4% of its gross sales into research, the average being about 2.8%. I doubt that the construction industry averages 0.1% of its funds directed to research . . . I wonder if we can hope to meet the problems of the future with something like a penny out of every ten dollars."

Professor Ferguson urged the ACI to act as a "concrete research booster club."

The annual meeting, which drew a record-breaking attendance of 900, highlighted many outstanding research projects now under way in the concrete field. But in almost all cases, the research results presented indicated a need for more basic research so that design and construction practices can be made more precise.

Eivind Hognestad, manager of the Structural Development Section, Portland Cement Association, Skokie, Ill., told the ACI that its Committee on Shear and Diagonal Tension was preparing a report that would recommend changes to be made in the ACI building code.

Based on available data, a new formula will be proposed for the cracking load due to diagonal tension. It will relate the average shear on the cross section of a rectangular beam, V/bd, to a constant (ranging from 1.9 to 3.5) times the square root of the 28-day compressive strength of the concrete. If stirrups are required, they will be determined by the load in excess of the cracking load.

The code now requires web reinforcement to carry the shear stress exceeding 3% of the concrete compressive strength. In beams without T-beam action, the web reinforcement must carry at least two-thirds of the total shear. This provision was inserted in the 1956 revision of the code after failures in the field and laboratory tests showed that the preceding requirement was inadequate.

Mr. Hognestad admitted that the proposed formulas for web reinforcement are not completely satisfactory, because of the implied assumption that the concrete is carrying tension when stirrups are fully stressed. However, the formulas are based on the best available information. More research is needed, he said. (See Editorial p. 344.)

Beams with high-strength reinforcing steel may be designed safely by ultimate strength theory, according to a preliminary committee report made to the meeting by Robert Sailer of the U. S. Bureau of Reclamation. However, the tentative finding points to more detailed work the committee will have to do before final recommendations are published.

Reinforcing steel conforming to ASTM Designation A432—with yield point of 60,000 psi—will form a major part of the reinforcing steel used in this country within the next decade, according to Mr. Hognestad. This, of course, will follow developments already made in Europe. In Sweden, for example, similar steel has taken over a large part of the reinforcing steel market since the early 1950s.

Experiments conducted at the University of Illinois raise serious questions about adequate design practice for prestressed concrete beams. Test results presented by J. G. MacGregor indicate that, contrary to usual design assumptions, draping strands actually decreases the shear strength of prestressed beams. Draping seems to permit earlier formation of flexural tension cracks, which in turn become inclined diagonal tension cracks. Tests were conducted on a series of 19 beams, some with straight strands, the others with strands draped at a variety of angles. Resistance to diagonal shear decreased in direct proportion to increase in the slope of draped strands in the test beams. Present design practice follows practically the opposite assumption, indicating need for still further work in the area and study of possible revisions in design practice. The paper was prepared by Mr. MacGregor, M. A. Sozen and C. P. Siess, all of the University of Illinois.

Research in the field as well as the laboratory was reported at the meeting. Bridge designers of the New York State Department of Public Works became concerned with the problem of true composite action in continuous structures of composite design. A comprehensive study was undertaken of a continuous pour of the deck of a three-span continuous bridge on Bruckner Expressway in New York City.

Placing of the concrete was carefully controlled and data were obtained on stringer deflections, placement of reinforcing steel, plasticity of the concrete, and many other factors. Plasticity was controlled by the use of varying amounts of retarder placed in the concrete mixture. The contractor cast a deck 40 ft wide and some 600 ft long in one working day.

F. E. Legg, Jr., of the University of Michigan, reported that producers are taking advantage of heavy media separation to upgrade many of the glacial gravels found in Michigan's lower peninsula and used in concrete subjected to severe winter exposure. They are trying installations with elastic fractionation equipment, jigs and soft particle disintegrators.

There are 14 beneficiation plants operating at the present time. Experience shows that for each installation, the beneficiation method has to be tailored to match the properties of the gravel deposit, Mr. Legg said.

"Epoxy" is fast becoming a common word in the construction industry, but there is nothing simple about choosing or applying epoxy resins if they are to do their designated task. Bailey Tremper of the California Division of Highways described how that state has employed epoxy resins in a variety of ways since 1954.

His main point: It is touchy stuff but really pays off if handled right. Best for concrete pavement repairs are low viscosity resins, modified with polysulfide polymers to improve their flexibility at low temperatures. California has made this modification successfully without serious strength loss of the epoxy. The trick in field work is balancing "pot life"—the period between mixing and setup—with the amount needed for a given job. Mr. Tremper said they have been able to brew mixes with a pot life of up to 20 minutes at 70F for spall patching. Traffic can run on the repaired area within three to five hours in many cases.

Epoxy mortar and concrete for repairing spalled areas costs up to $200 per cu yd but has been considered economical for such heavily traveled structures as the San Francisco-Oakland Bay Bridge. For extensive work—and when traffic permits—portland cement concrete bonded to the old surface with an epoxy resin binder is the answer. And there are tricks here, too. You need a low slump concrete—2 in. if possible—for one thing. And there is no use trying the process unless you get the concrete on before the resin starts to set up. Above all, get the surface clean before you start.

California engineers pressure grout cracks in highway pavements with the material, too. Mr. Tremper described the system this way. Pressure fittings go in holes drilled about 3 ft c-c along the crack. Cement the fittings in and seal the top of the crack, both with epoxy resin. After it has set up, pressure grout the crack through the fittings. But be sure to have vent holes along the top seal of the crack.

ACI has studies and research under way or in planning stages in a variety of areas, both expanding work reported at this meeting and covering new problems in design and materials. New criteria are being developed for special cases in ultimate strength design and for problems in prestressed concrete design. There is also research aimed at lightening restrictions on various types of floor system designs.

All these are still in committee or in the laboratory; results should be made available during the year and at next year's meeting.

Earthwork Starts Soon on

Construction will begin soon on Big Bend Dam, sixth of the Corps of Engineers' Missouri River Dams and last under the Pick-Sloan program.

Bids will be opened March 31 at Omaha on the first construction contract, and other contracts will follow at intervals to get the $137.5-million job firmly under way this year.

The first construction award will be for 7 million cu yd of earthwork. The cost of this first stage will run about $4 million.

The Corps has already received transformer bids and is soliciting bids now for eight 58,500-kva generators. It expects to invite bids next fall on the powerhouse substructure and intake, in the $20-million range.

Other major construction will be advertised in the next two years: spillway structure, about $8 million, summer of 1961; second-stage earthwork, bigger than the first-stage job, late summer or fall of 1961; powerhouse superstructure, about $8 million, summer of 1962.

The forthcoming earth placement will mark the beginning of work on the dam proper. Three earlier contracts have been awarded for an access road, construction bridge and turbines.

Fifth in size among the Corps' Missouri River dams (its embankment is about twice as big as Gavins Point) the dam will be located in the Indian country at Fort Thompson, downstream 64 miles from Pierre, S. D., and Oahe Dam. Its statistics:

Crest length	10,570 ft
Height	100 ft
Width at base	1,250 ft
Earth volume	17 million cu yd
Concrete volume	625,000 cu yd
Spillway capacity	367,000 cfs
Drainage area	249,000 sq mi
Installed capacity	468,000 kva
Reservoir capacity	1.9 million acre-ft
Reservoir length	80 mi

The Fort Thompson location is 31 miles downstream from the site first picked in the river's Big Bend. In the original scheme, power tubes were to have cut across the 28-mile oxbow loop's mile-wide neck, thereby gaining additional head (ENR Aug. 30, 1956, p. 25).

Army Engineers say the shift has two main attractions: It gets the foundations out of Pierre shale, a nightmare that engineers had to fight at Oahe Dam (ENR July 23, 1959, p. 42), and into Niobrara chalk, the best foundation material available in the upper Missouri Basin; and the lower tail water level at the downstream location in-

Two High Dams Vie for

Another fracas like the one over Hells Canyon appears to be shaping up on the Snake River.

Almost on the eve of the scheduled beginning of Federal Power Commission hearings on the much-debated High Mountain Sheep Dam, a license application for a huge rival project, Nez Perce, has been handed to the FPC. The first hearing, which was set for March 21, is now postponed.

Both dams would be located on the same stretch of the Snake River, along the Oregon-Idaho border. Nez Perce would be located 2.5 miles downstream from the juncture of the Snake and Salmon rivers, backing water up the Snake, Salmon and Imnaha. High Mountain Sheep would be located a half-mile above the Salmon's entry into the Snake, backing water up the Snake and Imnaha.

Nez Perce is proposed by 13 Washington Public Utility Districts, called the Washington Public Power Supply System. High Mountain Sheep is sponsored by Pacific Northwest Power Co., composed equally of Portland General Electric, Pacific Power & Light, Washington Water Power and Montana Power.

Since both dams are planned for the same reach of river, approval of one would block the other.

Because of this, the FPC has delayed the hearing set for High Mountain Sheep until it can decide whether the Nez Perce application is complete enough to be consolidated into the same hearing. The case probably will last for more than a year.

Nez Perce is estimated to cost $276.5 million, exclusive of fish facilities. It would be a 700-ft-high concrete arch dam (three million cu yd of concrete), have an initial power capacity of 1.2 million kw (six 200,000-kw units) and an eventual capacity of 2.4 million kw (twelve 200,000-kw units). Nez Perce would store up to six million acre-ft of water (4.5 million for flood control and power) in a lake covering 29,600 acres. It would have a net power head of 585 ft. With an average yearly river flow of 30,600 cfs, it could generate 7.5 billion kilowatt-hours of power a year. Its benefit-cost ratio is estimated at 3.21-1.

A major obstacle facing Nez Perce proponents is heavy fish runs up the Salmon River. Pacific Northwest Power located its dam where fish runs are much lighter, above the Salmon, but Nez Perce backers plan to hit the fish

Big Bend

creased the available drop from the pool elevation as fixed by the tailwater level at Oahe powerhouse upstream.

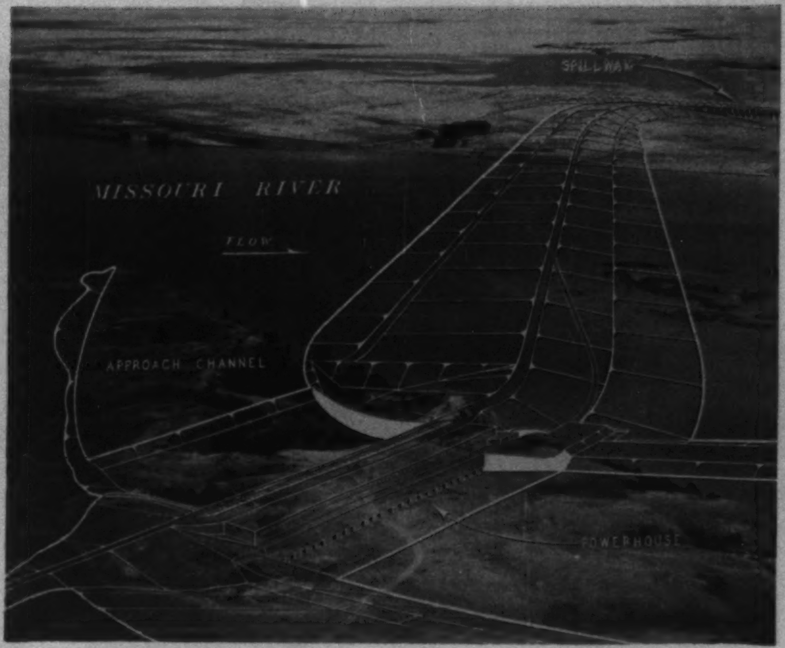
Big Bend will complete development of the available power over a 467-mile stretch of the Missouri from Oahe's headwater to Fort Randall Dam.

The new dam will have a flat S-shape designed to cut down on spillway and powerhouse excavation. The curve aligns the left embankment with two knobs that bracket a saddle where the 375-ft-long spillway will be located. The S-shape steers the right, or powerhouse, end of the dam clear of a 200-ft-high bluff and into a creek mouth. (The curve has also given the dam a nickname: "Big Bent.")

Big Bend will be primarily a power project. Only three feet of pool elevation and 180,000 acre-ft of storage capacity is reserved for flood control. Its generating capacity will be second only to Oahe's among the Missouri River hydro projects, and it may be practical to add more generating units later.

The extension of Big Bend's pool to Oahe's tailwater will substantially lessen retrogression of the stream bed below Oahe. This will reduce the cost at Oahe of protective construction and other measures to cope with a lowered bed. At Fort Randall, which does not discharge into another dam's headwater, turbines were lowered in anticipation of a 15-ft retrogression.

Construction of Big Bend is under the direction of the Omaha District of Army Engineers. Col. David G. Hammond is district engineer. Jerome O. Ackerman is chief of engineering. Ed Soucek is chief of design. Project engineer is E. A. Johns. Charles Boyd is area engineer.



Corps' last big Missouri River dam is out for bids.

One License

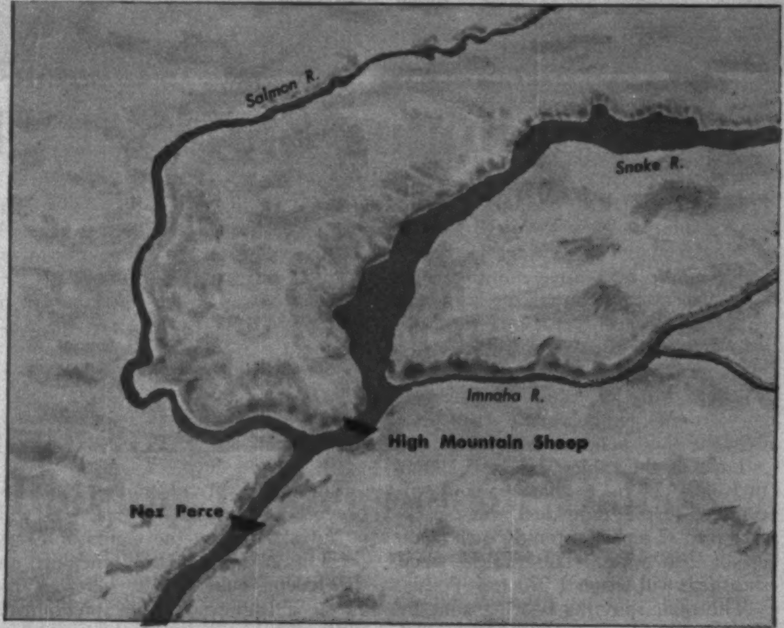
conservationists head-on at all levels.

Fish commissions and associations from Oregon, Washington and Idaho had already intervened in the High Mountain Sheep application to keep an eye on fish planning. They are certain to fight Nez Perce, since it blocks the principal river carrying migratory fish in the area. The Interior Department and the late Sen. Richard Neuberger (D., Ore.) are on record against Nez Perce until adequate fish provisions can be devised.

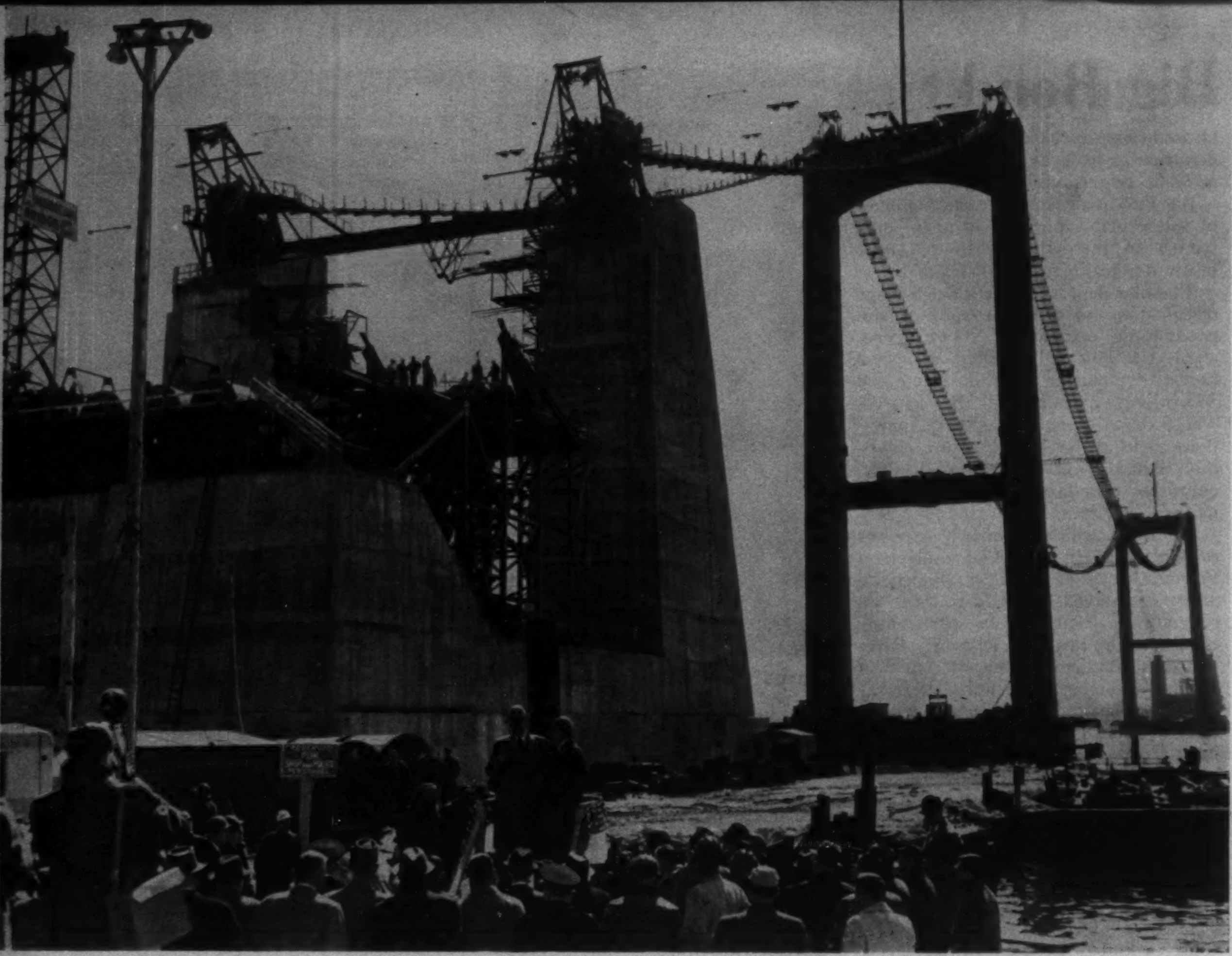
The Army Engineers also recommended High Mountain Sheep over Nez Perce in their Columbia River report. because of the latter's fish problems. And Sen. Frank Church (D., Idaho) is pushing a bill through the Senate to prohibit any new dams on the Salmon until satisfactory fish-passing methods can be found.

However, the 13 Washington PUDs hope that their application will promote a federal "crash program" to develop these fish facilities.

High Mountain Sheep would cost $178 million, generate a maximum of 1.75 million kw, hold back up to 3.6 million acre-feet of water in a 17,200 acre lake. It would be a 690-ft-high concrete arch structure. Although High Mountain Sheep storage and power potential are less than those of Nez Perce, Pacific Northwest Power claims that a dam at the Lower Canyon site on the Salmon would overcome the deficiency. It could be built later, when the fish problem is solved, and, together with High Mountain Sheep, would generate more power and store more water than Nez Perce. Lower Canyon, however, isn't included in the High Mountain Sheep license application.



Choice is between sites only three miles apart.



Cable Spinning Starts at Throgs Neck

Workmen started spinning the two main cables of New York City's $90-million Throgs Neck Bridge last week—and in the next three months, spinning machines mounted on both the Bronx and Queens anchorages of the huge structure will process some 14,000 miles of 0.196-in.-dia wire.

That's what is needed to make up the main support for the structure's 2,910 ft of suspended roadway.

Each of the cables will be 3,200 ft in length, 23 in. in diameter and will contain 10,952 individual wires packaged into 37 separate strands, each made up of 296 wires. The cables, when sheathed, will weigh 1,790 tons apiece.

The cable spinning is being done by the American Bridge Division of United States Steel Corp. with wire manufactured by American Steel & Wire, another U. S. Steel affiliate.

The Throgs Neck Bridge will be a six-lane structure spanning the East River and part of Long Island Sound between the Boroughs of Bronx and Queens. It will have a total of 9,400 ft of approach viaducts. Its suspended section will consist of a main span of 1,800 ft and two 555-ft side spans.

The roadway of the suspended span will clear MHW by 142 ft at the center and 138 ft at the towers. The towers, which rise 360 ft above MHW, are supported by foundations carried to depths of 135 and 148 ft. The structure is owned by the Triborough Bridge and Tunnel Authority. Ammann & Whitney, New York City, are consulting engineers for the main suspension bridge; E. Lionel Pavlo is consultant on the approaches.

Great Lakes Link Proposed

The practicality of another canal between Lake Ontario and Lake Erie will be investigated by the Corps of Engineers if an appropriation included in the federal budget, now before Congress, is approved. This preliminary survey would determine the feasibility of a full-scale study.

The only navigation route between the lakes is Canada's Welland Canal.

A fresh spark of interest has been kindled by an independent engineering survey conducted for New York State Assemblyman Harold H. Arno. In this study, two routes have been proposed.

One route would start at Olcott, N. Y., on Lake Ontario, run 24 miles south to Lockport and terminate at North Tonawanda on the Niagara River. The alternate plan calls for a 20-mile canal originating at Wilson, N. Y., on Lake Ontario, and bypassing Lockport via a more direct route to the same terminal point of North Tonawanda.

Both plans call for five double locks with a combined lift of 326 ft. Depth of the canal would be 27 ft. All highway crossings would be tunnels.

Ante: $100,000

Nine firms each spend that just to prepare their bids

Nine developers paid about $100,000 each last week just to get into the bidding on a project.

The project: Redevelopment of San Francisco's antiquated produce market area into a 20-acre neighborhood of apartment buildings, parks and shopping facilities.

This compromises the first two sections of the envisioned 44-acre Golden Gateway. Phase two, to come later, will cover commercial structures.

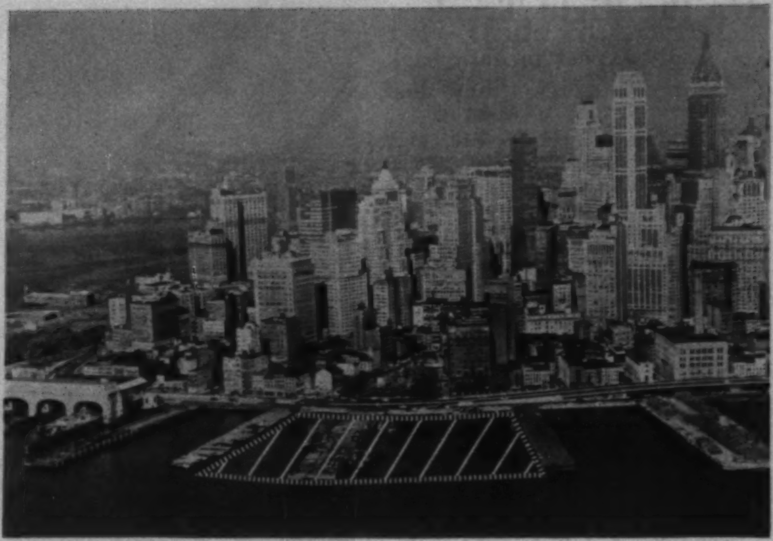
Builders' proposals ranged from $50 million to $80 million.

The $100,000 cost to each bidder included fees for architects, lawyers and fiscal experts.

The combinations of developers, contractors and architects that submitted the Phase-one proposal are:

- Tishman Cahill Renewal Associates, consisting of Cahill Construction Co., San Francisco, and Renewal and Development Corp., New York; architects Carl Warnecke and Victor Gruen, San Francisco.
- Joseph Eichler, Eichler Homes, Inc., in association with Dinwiddie Construction Co.; the architect is Anshen & Allen. All three firms are from San Francisco.
- Barrett Diversified Enterprises, San Francisco, including Braemer & Associates, Los Angeles; architects Daniel, Mann, Johnson and Mendenhall, Los Angeles.
- Golden Gateway Center Corp., a syndicate consisting of Edward D. Keil and Nathaniel A. Owings, San Francisco, and Lewis E. Kitchen, Kansas City; architects Skidmore, Owings and Merrill, San Francisco.
- Del E. Webb Construction Co., Phoenix, and Kern County Land Co., San Francisco; the architect is Welton Becket & Associates, also of San Francisco.
- Webb & Knapp Inc., San Francisco; architects I. M. Pei and Associates, San Francisco.
- Utah Construction and Mining Co., San Francisco, with Henry C. Beck Co., Dallas; architect Angus McSweeney, San Francisco.
- Perini Corp., architects Wurster, Bernardi & Emmons, all of San Francisco.
- Sidney Leiken Enterprises, Roseburg, Ore., with Theodore G. Meyer & Sons, San Francisco; architects Lubicz—NYCZ and Collier & Langley, both of San Francisco.

The competing models went on display last week at 525 Goden Gate Ave. the redevelopment agency's headquarters.



Heliport Planned for Wall Street

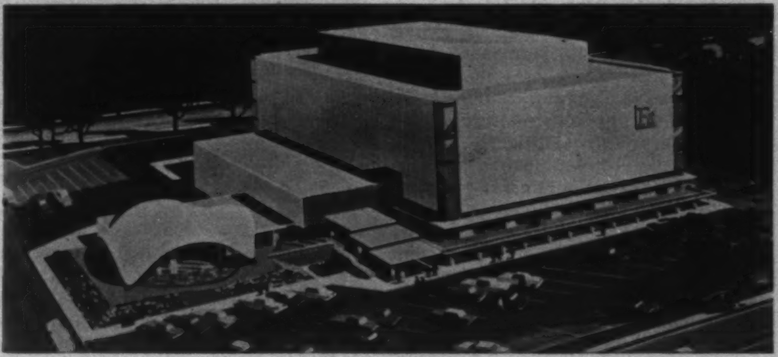
The second heliport for New York City, a $165,000 helicopter landing pad on the East River next to Manhattan's financial district, has been proposed by the Port Authority of New York and the city's Department of Marine and Aviation.

Air travelers would be able to get from the heliport to LaGuardia Airport in eight minutes, to Newark Airport in 10 minutes and to New York International Airport (Idlewild) in 15 minutes.

The site of the heliport will be the city's Pier Six (center of cross-hatched area in picture). But the authority will rent the entire 310,000-sq-ft-area marked and expand the heliport to meet the demands of traffic.

The heliport would be adjacent to the proposed $250-million World Trade Center (ENR Feb. 4, p. 28).

The city's first heliport, on the Hudson River at 30th St., was completed in 1956 (ENR July 19, 1956, p. 24).



Building Center Set for Dallas

Construction of Fleetwood Square, a $3-million construction industry center in Dallas, will start in midsummer with completion scheduled for August, 1961.

The project will have three major units:

Fleetwood Tower, a five-story office-exhibit building.

Fleetwood Terrace, an adjoining auditorium seating 560.

Fleetwood Fountains, a public restaurant roofed in thin-shell concrete and half-encircled by a moat with lighted fountains.

Tenants will be building products manufacturers or their representatives, and construction trade associations. Each tenant will have to maintain a year-round public display of products. The promoters hope to stage annual trade shows for a five-state area.

Builder and part owner of Fleetwood Square is Edmund G. Peterson. George L. Dahl is architect-engineer.

On the Right Track

Rails expect to gain back some business they lost

The railroads are optimistic that they will recover a larger share of this country's transportation business. They also expect to reduce costs and provide better service through increased efficiency and more research and development.

How to achieve these and other goals of vital concern to the railroad industry were discussed at the 59th annual meeting of the American Railway Engineering Association last week in Chicago.

In keeping with tradition, much of the three-day meet was devoted to reports by the association's 23 standing and special committees. They covered a wide range of subjects dealing with rails, ties, tracks, bridges, buildings, water service facilities, yards and terminals.

The railroads believe prefabrication can cut their construction costs. This includes structural building panels and track sections with rails already mounted on the crossties. Savings are also expected from increased use of welding in railroad bridges, and use of prestressed concrete piling, beams and girders. Laminated wood stringers and girders for bridges up to 70-ft span may be the most economical in some areas.

Prestressed concrete crossties are now undergoing field tests (ENR Mar. 10, p. 26), and studies are under way on combating erosion by laying ballast in asphalt or heavy petroleum.

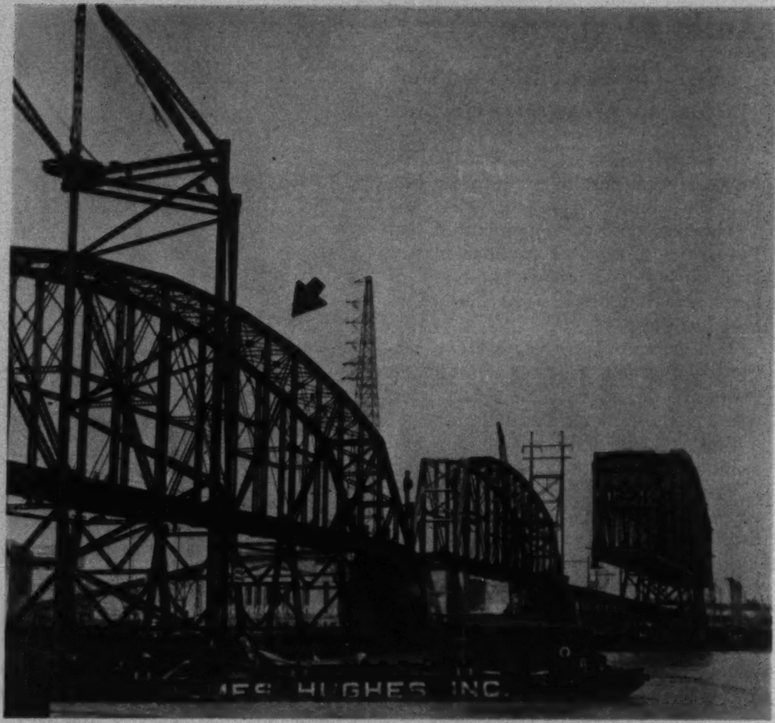
The railroads want the present 40-year tax depreciation schedule for railroad property cut to 15 years for rolling stock and 20 years for permanent structures.

The railroads also want enabling legislation to set up construction reserve funds out of pre-tax income. These funds would be temporarily exempt from taxes if spent within five years for new facilities. This would constitute tax deferral—not tax forgiveness. But it would make substantial funds immediately available each year for capital expenditures.

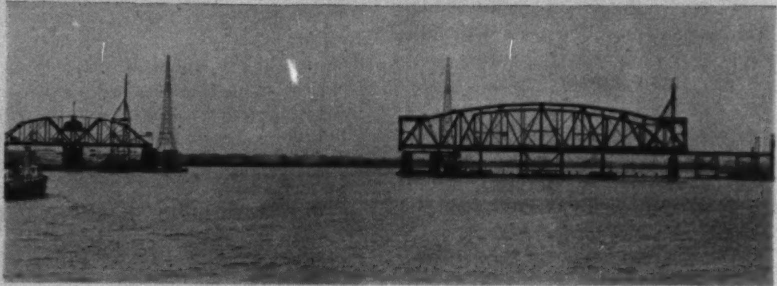
The railroads base their contention that they will regain much of the business lost to truckers and airlines on two points:

- As the highways and airways become saturated there will be an overflow of traffic to the railroads.
- The second point is the rapid growth of "piggyback" transportation. Total trailer-on-flatcar loadings last year were 50% greater than in 1958, and 150% higher than in 1955.

E. J. Brown, chief engineer, Burlington Lines, was elected president of AREA. He succeeds F. R. Woolford, chief engineer, Western Pacific Railroad.



New lift span (right) awaits removal of old fixed span (arrow).



Gap in bridge will be filled by lift span floating at right.

Old Swing Bridge

Four years of planning, construction and erection culminated late last week when a 533-ft-long, 2,465-ton double track span was floated out from a bridge across the Delaware River and replaced with an even longer and heavier span.

The replacement span measures 542 ft and weighs 2,670 tons. It will ultimately become the world's longest double track vertical lift span. It will be only 16 ft shorter than the single track record holder across the Arthur Kill between Staten Island and New Jersey. But until its towers are erected later this year, the big span will be fixed.

The structure is the Delair Railroad Bridge, a main-line link of the Pennsylvania Railroad between Camden, N. J., and Philadelphia. Its 4,397-ft total length includes trestle approaches at both ends, three 533-ft fixed spans and a 323-ft swing span.

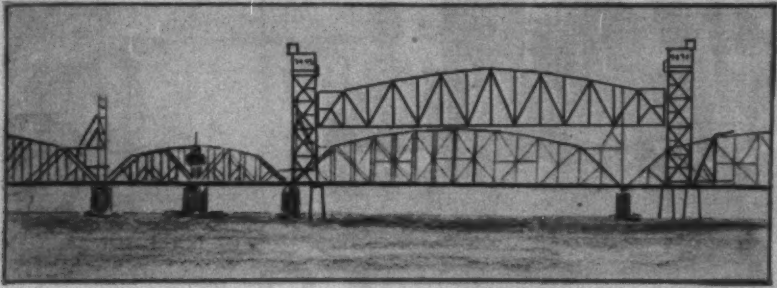
The swing provides a horizontal clearance between fenders of only 120 ft and its position necessitates a curved channel. These two factors have long been regarded as navigational hazards.

The bridge was built in 1895 by A&P Roberts, a predecessor of American Bridge Co. Structurally, it is in good shape. It was decided therefore to enlarge the horizontal clearance to 400 ft by straightening the channel and replacing one of the fixed spans with the vertical lift.

Here's how it was done:

Three new piers were constructed under the existing bridge by John F. Casey Co., Philadelphia. These piers

Old span is towed towards scrap yard, where it will be cut up.



Here's how the bridge will look. Swing span will be fixed.

Gets a New Lift

permit shortening of one adjacent span, provide temporary bearing for the new span and, with one existing pier, will serve as the base for the new tower legs.

The new span was erected on barges moored at the site. At another job site, additional barges were fitted with towers for lifting the old span.

At low tide one morning last week, three tugs jockeyed the lifting barges into position beneath the old span and held them there against the current of the rising tide. Overhead, workmen busied themselves with freeing the span from its connection with the rest of the structure. As the tide neared flood, the lifting towers made contact with the lower chord of the span and raised it from its bearings. Then began the short haul to a scrap yard about two miles upriver.

Three days later, this procedure was reversed, and the new span was floated, uneventfully, into place.

Construction of the lift span towers will begin immediately. Completion is planned for late this year.

The superstructure was fabricated and placed by American Bridge Co. Division of U. S. Steel. The entire project is being supervised by the Philadelphia District Office, U. S. Army Corps of Engineers, and the Pennsylvania Railroad. Structural design was handled by Hardesty & Hanover, New York City consulting engineers.

Gibbs and Hill, Inc., of New York, was responsible for design of transmission lines and catenary structure.

Fire Code to Change

Greater safety at less cost is goal of NFPA proposal

A new version of the Building Exits Code has now been drafted. When adopted, it will insure greater fire safety for schools—at less expense for compliance.

The Code, a standard of the National Fire Protection Association, is widely used as a basis for local codes. Its re-evaluation was prompted by the 1958 Chicago school fire.

The most significant proposed change in the code—in contrast to existing practice—is the elimination of requirements for fire-resistive construction. The reason for the change: Recent tests showed that during a fire the spread of smoke is so rapid that its effects are fatal—if occupants do not escape quickly—long before the structure of the building is badly effected by fire (ENR Jan. 21, p. 24).

Consequently, the new code draft emphasizes need for adequate provision to stop the upward spread of smoke in vertical openings. The average school was found to have stairs either completely without enclosures or protected by doors, held open by a fusible link control. This is effective in stopping the spread of fire, but too slow to stop the spread of lethal smoke.

The new code gives greater recognition also to automatic sprinklers, which in previous practice were largely limited to old open stairway buildings.

The combustibility of interior finish—largely overlooked in existing school construction—is spelled out in the new code. Finishes of greater combustibility than wood are prohibited.

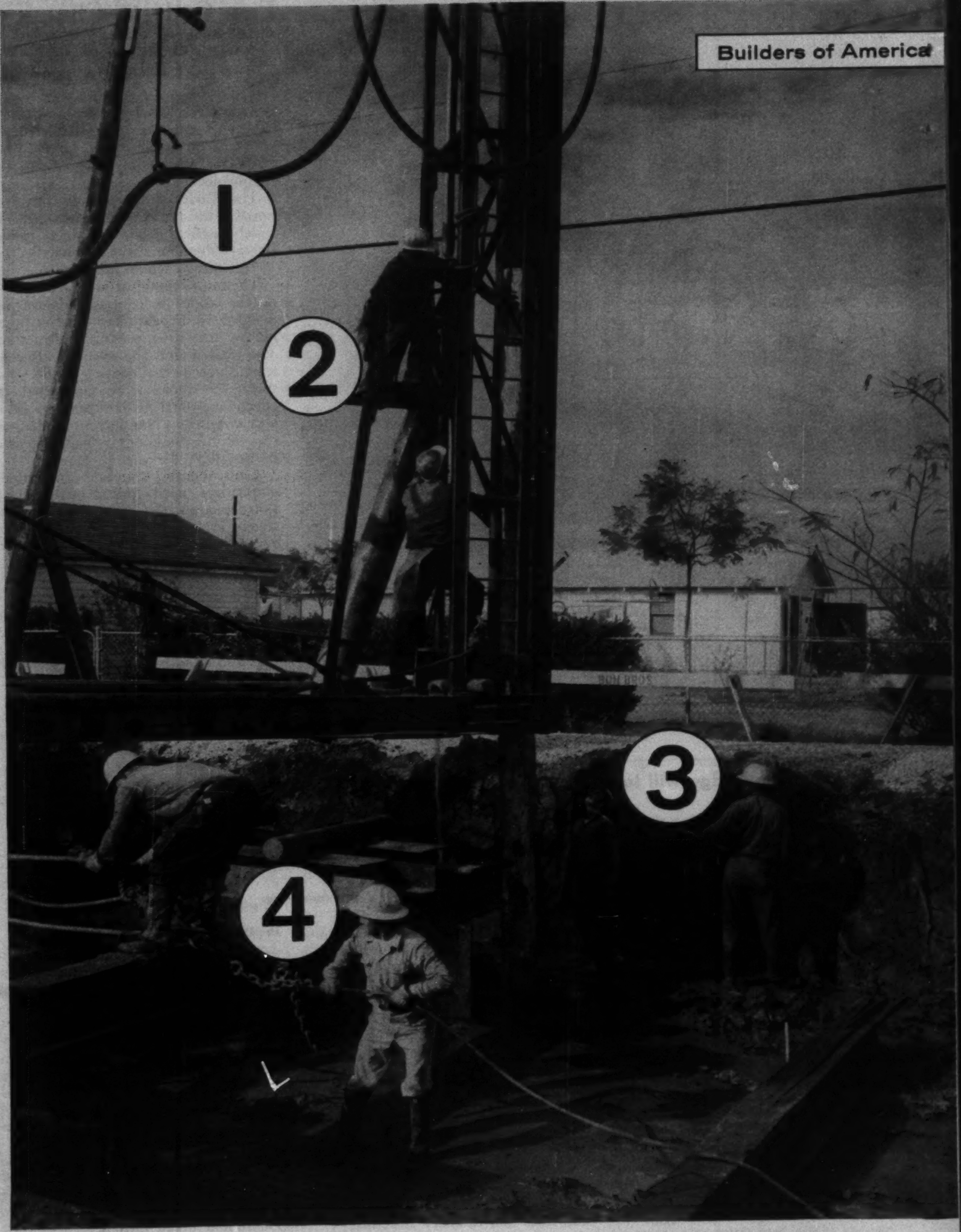
A school building that complies with the existing Building Exits Code would comply substantially with the new code, but many more variations and economies will be permitted.

West Coast City Will Reclaim Sewage Effluent

The sale of $1 million in sewer revenue bonds and a call for construction bids marked the start of a sewage effluent reclamation program for San Bernardino, Calif.

The project will be carried out jointly by the city and the San Bernardino Valley Municipal Water District. The city will construct effluent pipelines and a pumping station. The district will buy 160 acres of land for recharge basins at a cost of roughly $90,000.

The effluent reclamation will restore badly needed water to the ground by percolation and avert the looming necessity of building a $40-million to $50-million ocean outfall.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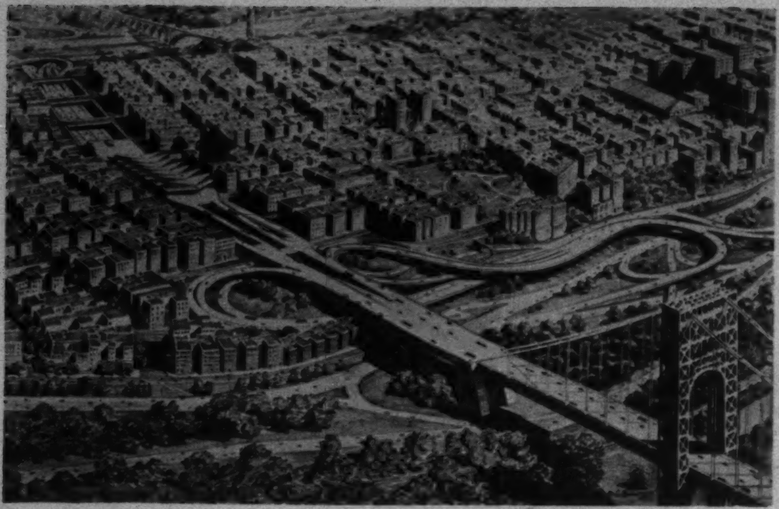
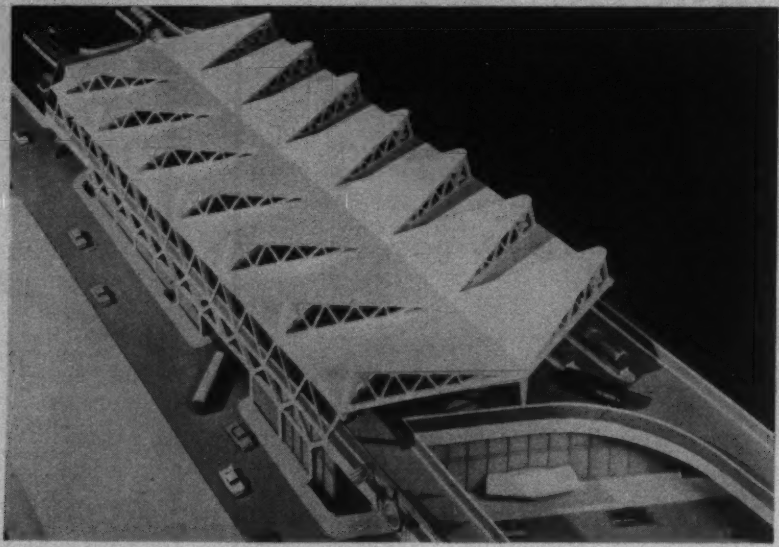


At New York End of Bridge . . .



. . . Nervi Designs a Bus Station

The $13-million George Washington Bridge Bus Station will be New York's first building designed by Pier Luigi Nervi, world-famed Italian architect-engineer. The three-level, 400x185-ft structure will straddle a depressed expressway linking with the lower-deck roadway of the George Washington Bridge (ENR Jan. 28, p. 44).

Foundations for the bus station were built with the expressway retaining walls. A contract for the building's superstructure will be let this spring. Scheduled completion date is 1962.

The concrete roof comprises 26 triangular sections, spanning the 185-ft width of the building across a single line of interior columns. Fourteen of these roof sections slope upward from the center columns. Each 92x66-ft triangular section contains 36 precast panels.

The sides of the raised roof sections and the building walls have triangular openings formed by precast concrete members. These openings will provide ventilation of the bus platforms at the upper floor level and the expressway below.

The bus station will replace and consolidate scattered terminals and sidewalk stations for 2,000 buses serving 50,000 New Jersey commuters. It will also furnish underground access to the north-south Manhattan subway lines.

It is part of the George Washington Bridge lower-level project. The Port of New York Authority has awarded contracts on this project totaling $58.4 million.

LA Wharf Burns

Fire destroys terminal just before dedication

Fire whipped along 1,700 ft of wharf in Los Angeles Harbor last week destroying the Matson Navigation Co.'s $1.85-million container terminal (ENR Mar. 17, p. 27) and leaving an estimated total loss of $2 million to $2.5 million.

An investigation is under way to determine the cause. One report says the blaze was touched off by sparks from a welder's torch. Welding had been in progress at the base of the terminal's giant gantry crane, where firemen determined the fire started.

The fire licked along the timber wharf and spread to a nearby lumber barge, destroying the barge itself and 70,000 board-feet of creosote-impregnated pilings it contained. A concrete warehouse at wharfside was also damaged.

The terminal would have marked the harbor's entry into the age of push-button loading of containerized cargoes. It was to be dedicated April 15 and assigned to the Matson Steamship Co. It is estimated that the fire will push the project back at least a year.

Early efforts to control the blaze were frustrated when the fire spread to wood piling beneath the pier. For a while the fire threatened to topple the 125-ft, 350-ton crane.

The Matson wharf was being built for the harbor by Pugh Construction Corp., San Pedro, Calif.

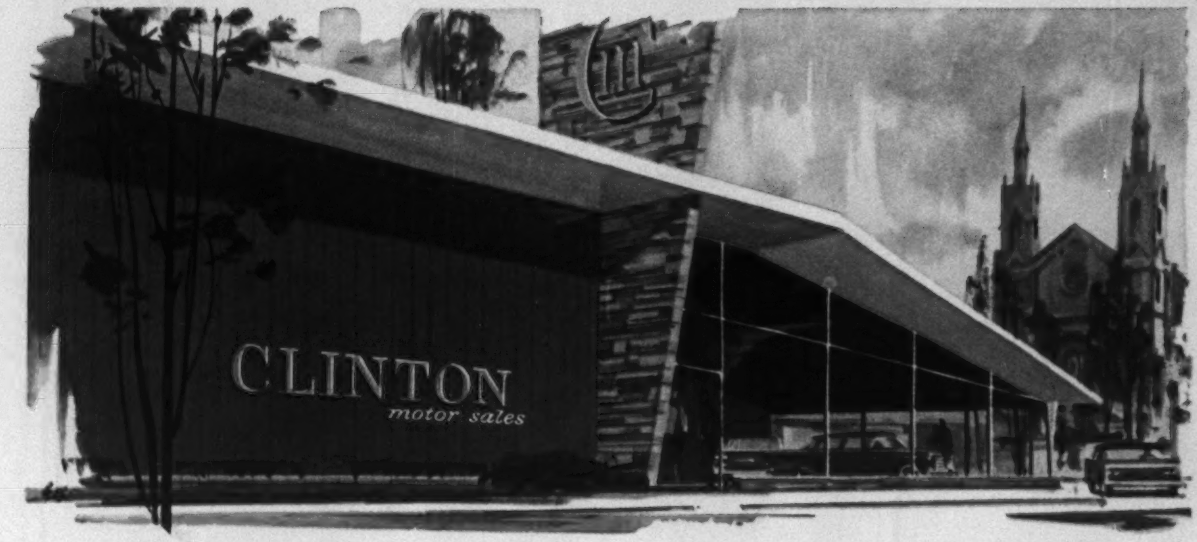
May Opening Date Set for Spring Creek Tunnel Bids

The Bureau of Reclamation will open bids May 5 for construction of Spring Creek power conduit on the Central Valley Project in northern California.

The conduit will comprise two sections of 18.5-ft-dia tunnel 8,620 and 4,400 ft long and a 17-ft-dia section of siphon 3,100 ft long. It will run from Whiskeytown Dam, to be started this year on Clear Creek, to existing Keswick Reservoir on the Sacramento River.

It will complete 15 miles of tunnel in a system to transfer water from the Trinity River, which flows into the Pacific about 30 miles from the Oregon border, to the Sacramento, which waters the rich agricultural land in the Central Valley. Other major units in the system are: Trinity Dam, on the Trinity River, over 80% complete; Lewiston diversion dam, Trinity River, not started; Clear Creek Tunnel, from Lewiston Dam to Whiskeytown Dam, over two-thirds finished.

Bidding and supervision are under the Bureau of Reclamation's Trinity River Division, with headquarters in Lewiston, Calif.



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Proved, practical modular design assures ease of expansion any time and easy expansion with a reasonable price tag for a high quality building. And you'll add savings in time to the basic economy of Stran-Steel pre-engineered buildings, because they go up in weeks, not months. For complete information, fill in and mail the coupon.

STRAN-STEEL

Clip coupon and mail to STRAN-STEEL CORPORATION, DEPT. ENR-5, DETROIT 29, MICHIGAN

Please send complete literature on Stran-Style Buildings in Stran-Satin Color. I'm interested in a building approximately ________ ft. by ________ ft. to be used for ________

Name________ Title________
Company________ Phone________
Address________ County________
City________ Zone________ State________

STRAN-STEEL IS A DIVISION OF **NATIONAL STEEL CORPORATION**

Tough underpass job finished on time despite high ground

GULF MAKES THINGS

Take the unusually high ground water level of New Orleans, add a lot of rain, then tackle a job like this on a tight schedule. Build a $2,000,000 underpass beneath a 3-deck interchange (all decks in use with heavy traffic) with headroom under ramps as low as 22 feet. Brother, you've got a tough one.

That was the case with Melvin "Red" Morgan, Project Superintendent for R. P. Farnsworth & Co., Inc., New Orleans. His job was to build an underpass system beneath the Airline Highway-Causeway Boulevard Interchange for the Department of Highways, State of Louisiana. (Palmer & Baker, Inc., were the consulting engineers.) To add to his construction problems, a busy railroad line angled across the site.

Farnsworth & Co. finished the job on time—with help from clean-burning Gulf diesel fuel, clean-working Gulf Dieselube H.D. motor oil, and Gulflex A grease. Gulf products enable Farnsworth's engines to run clean with maximum power output. Equipment stays on the job with a minimum of mechanical delays. And maintenance

High ground water kept shovel tracks soaking wet throughout the digging operation. Here, a workman performs preventive maintenance with Gulflex A multi-purpose grease.

RED
CATERPILLAR

Gulf Sales Representative Al Pfister, right, with Farnsworth Project Superintendent Melvin Morgan. You can always rely on helpful petro-engineering service from Gulf at the job site.

water level and low headroom . . .

RUN BETTER!

costs are trimmed to the bone. Proof, again, that Gulf makes things run better!

"Red" Morgan says, "During the 16 years I've been with Farnsworth, I have used Gulf fuels and lubricants on every job but one. That's why I knew that we wouldn't have any combustion or lubrication problems with Gulf oils and greases."

You can do the job faster and reduce maintenance costs with Gulf products and service. For proof, call your Gulf office, or write for "Gulf Contractors' Guide."

GULF

GULF OIL CORPORATION
Dept. DM, Gulf Bldg., Pittsburgh 30, Pa.

Please send "Gulf Contractors' Guide."

Name______________________________
Title______________________________
Company___________________________
Street_____________________________
City____________Zone_____State_________

SP-9739

BORDEN
First IN FLOOR GRATING
ELIZABETH, N. J.

HERE'S HOW BORDEN FLOOR GRATING CUTS COSTLY FIELD CORRECTIONS

Insures correct dimensions, fit, and placement . . . .

1. A shop drawing of the job is submitted to the customer for approval, when necessary. This plan shows the size and shape of the grating area—how grating clears all obstructions.
2. Each finished panel is carefully checked for accuracy of dimensions.
3. Each panel is plainly marked with its number to insure quick, easy installation.
4. The entire platform is laid out on our shop floor. Over-all dimensions and obstruction openings are checked against shop drawings.
5. Erection diagram showing panel mark numbers is supplied for field installation.

BORDEN METAL PRODUCTS CO.

Gentlemen:

"Please send me NEW 1960 BORDEN Catalog"

NAME ....

TITLE ....

COMPANY NAME ....

ST. AND NO. ....

CITY AND STATE ....

Write today for *free* 16-page catalog showing all basic types of grating; more than 30 dimensional drawings of sub-types; eight safe load tables for steel and aluminum grating.

BORDEN METAL PRODUCTS CO.

"Greatest name in gratings"

815 Green Lane
Elizabeth 2-6410
Elizabeth, N. J.
Plants at: Union, N. J. – Leeds, Ala.
Conroe, Texas – Beeton, Ontario

←CIRCLE 73 ON READER SERVICE CARD

CIRCLE 74 ON READER SERVICE CARD

Construction Cost Trend Recognition

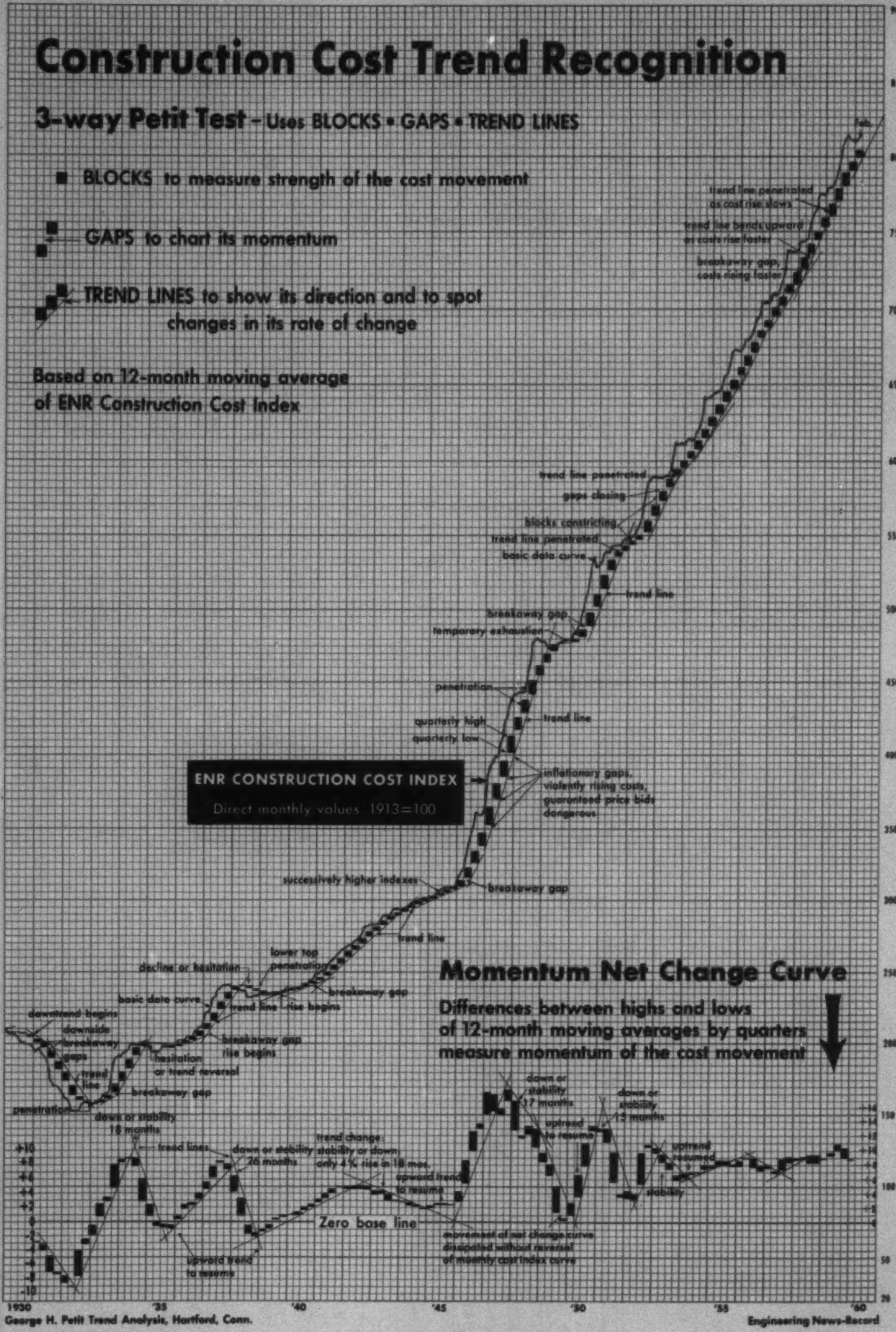
3-way Petit Test - Uses BLOCKS • GAPS • TREND LINES

■ BLOCKS to measure strength of the cost movement

GAPS to chart its momentum

TREND LINES to show its direction and to spot changes in its rate of change

Based on 12-month moving average of ENR Construction Cost Index



Momentum Net Change Curve

Differences between highs and lows of 12-month moving averages by quarters measure momentum of the cost movement

George H. Petit Trend Analysis, Hartford, Conn.

Engineering News-Record

Supplement to Engineering News-Record, March 24, 1960. Business News Department, Engineering News-Record, 330 W. 42nd St., P.O. Box 89, Times Sq. Sta., New York 36, N.Y. Reprints are available at 50 cents each. Multicopy rates on request.

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Engineering News-Record 20-Cities Cost Indexes 1913=100

CONSTRUCTION COST INDEX

Year:	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
	93.90	87.40	96.55	95.10	100.53	97.20	90.82	96.33	93.43	90.70	100.00

1914	1915	1916	1917	1918	1919	1920	1921	1922	1923	1924	1925
88.56	92.88	129.58	181.24	189.20	198.42	251.29	201.82	174.45	214.12	215.38	206.68

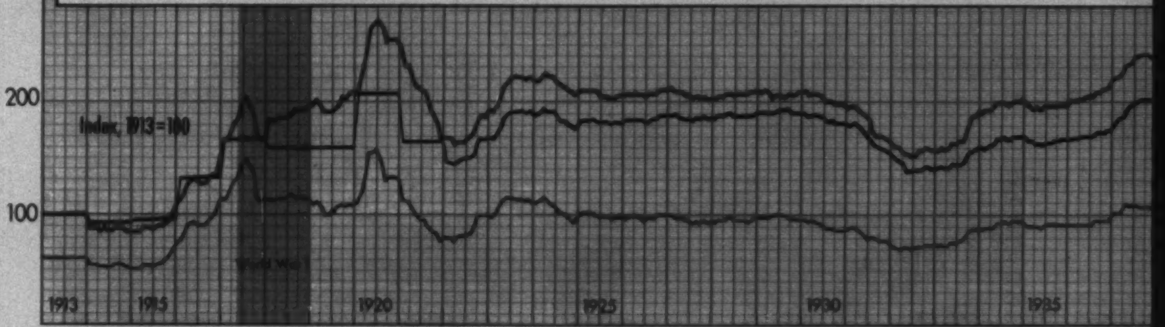
Yr-Mo	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Average
1926	207.15	206.85	207.65	207.05	207.20	204.80	207.80	208.20	208.20	209.80	210.80	210.80	208.03
1927	211.50	210.15	208.80	209.00	206.80	206.55	203.65	205.80	203.80	204.40	201.96	203.90	206.24
1928	203.90	204.65	204.65	206.40	207.00	206.15	206.65	207.29	207.29	207.71	209.46	210.16	206.73
1929	209.40	210.40	207.78	203.40	205.15	206.65	204.77	206.91	207.57	206.22	206.48	209.46	207.02
1930	208.96	206.46	206.80	207.12	205.86	203.36	200.95	200.95	199.58	196.72	198.54	196.66	202.85
1931	194.48	196.61	194.51	191.63	189.33	187.23	174.37	171.36	171.40	169.78	169.28	166.23	181.35
1932	162.48	161.83	157.24	153.12	152.78	152.20	153.36	156.80	157.96	156.16	158.20	158.46	156.97
1933	158.44	159.30	158.44	160.16	164.20	163.41	165.50	167.00	175.48	187.74	190.14	192.14	170.16
1934	191.25	194.06	194.06	195.96	199.61	199.61	199.66	195.40	200.86	200.86	201.36	201.86	198.10
1935	198.22	196.07	194.41	194.65	193.96	196.73	197.43	197.45	197.30	197.50	197.35	197.20	196.44
1936	201.23	201.33	201.63	202.80	204.05	206.06	204.80	208.48	209.85	211.53	211.50	215.70	206.42
1937	221.20	222.05	224.75	231.35	233.45	237.25	239.90	240.65	241.62	241.90	241.40	241.05	234.71
1938	239.62	238.99	238.79	237.95	236.80	236.86	232.20	232.30	232.70	234.30	234.40	234.90	235.83
1939	234.72	234.31	234.43	234.86	234.60	235.02	234.94	234.90	234.97	236.86	238.20	238.17	235.51
1940	238.34	238.32	238.20	238.26	238.86	241.50	242.15	242.18	244.13	245.62	247.24	249.12	241.96
1941	249.60	250.50	250.71	252.40	255.55	256.79	258.18	260.41	263.12	264.46	266.13	266.16	257.84
1942	267.63	269.41	269.71	271.78	272.30	274.19	277.65	281.61	281.61	282.44	283.64	283.60	276.30
1943	283.46	283.48	285.24	288.80	289.57	289.94	289.92	291.38	294.09	294.31	294.41	294.51	289.95
1944	294.57	295.05	295.34	297.70	298.00	298.72	299.94	300.42	300.46	301.06	301.00	302.30	298.72
1945	302.50	303.70	304.80	306.43	307.43	308.90	308.90	309.06	309.28	309.28	309.28	312.48	307.75
1946	316.22	319.82	323.83	334.50	339.69	346.72	354.70	361.27	360.19	360.94	362.47	369.30	345.98
1947	386.97	393.73	395.45	399.56	399.96	406.63	413.75	422.85	426.38	434.56	436.91	441.13	413.24
1948	441.65	442.67	443.60	443.64	444.86	455.90	464.83	477.11	478.40	480.21	478.25	477.86	460.72
1949	477.41	475.37	474.80	474.34	472.10	473.78	477.46	479.28	479.78	480.54	480.02	480.32	477.02
1950	484.74	484.85	488.35	491.94	496.85	506.88	512.67	521.26	530.97	536.23	530.01	530.83	509.62
1951	532.83	536.60	539.83	540.57	543.53	543.37	542.94	543.46	543.57	547.11	547.56	548.27	542.66
1952	548.43	549.86	551.30	554.72	557.71	562.29	571.25	584.29	586.65	589.03	589.21	588.09	568.40
1953	587.87	587.70	588.04	590.07	589.57	593.71	604.64	612.56	610.89	611.64	611.80	611.30	599.58
1954	614.06	614.73	614.01	615.28	618.71	621.91	625.26	641.66	640.15	641.49	642.42	642.71	627.96
1955	643.72	645.24	645.70	647.40	653.26	655.96	669.69	672.24	672.74	673.59	673.20	673.13	659.72
1956	675.36	680.21	680.20	683.28	686.43	692.13	694.75	696.31	704.91	703.86	704.13	703.82	692.27
1957	707.90	710.06	708.64	709.30	715.70	721.36	724.15	736.63	737.78	737.14	737.43	738.06	723.55
1958	743.44	743.77	744.41	745.78	751.57	757.31	762.82	764.44	773.47	775.30	774.12	773.81	759.16
1959	778.28	778.75	781.35	784.41	790.37	795.16	806.60	811.15	812.56	811.40	809.75	806.63	797.33
1960	812.03	812.93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

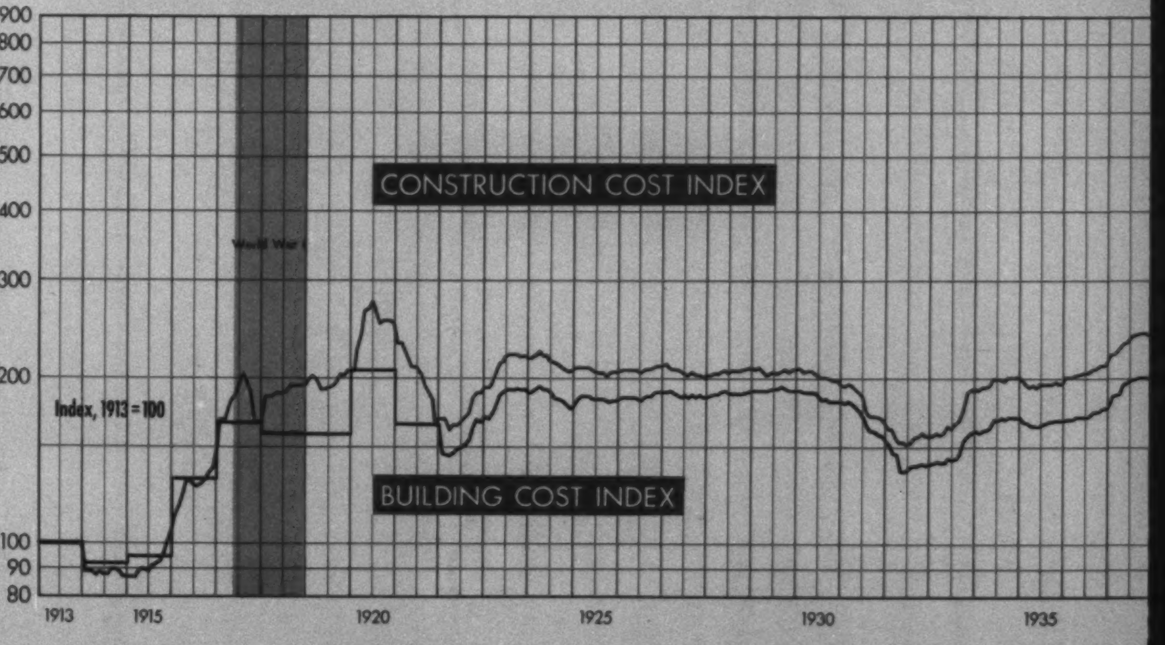
BUILDING COST INDEX

Year:	1903	1904	1905	1906	1907	1908	1909	1910	1911
	....	....	....	....	....	....	....	....	....

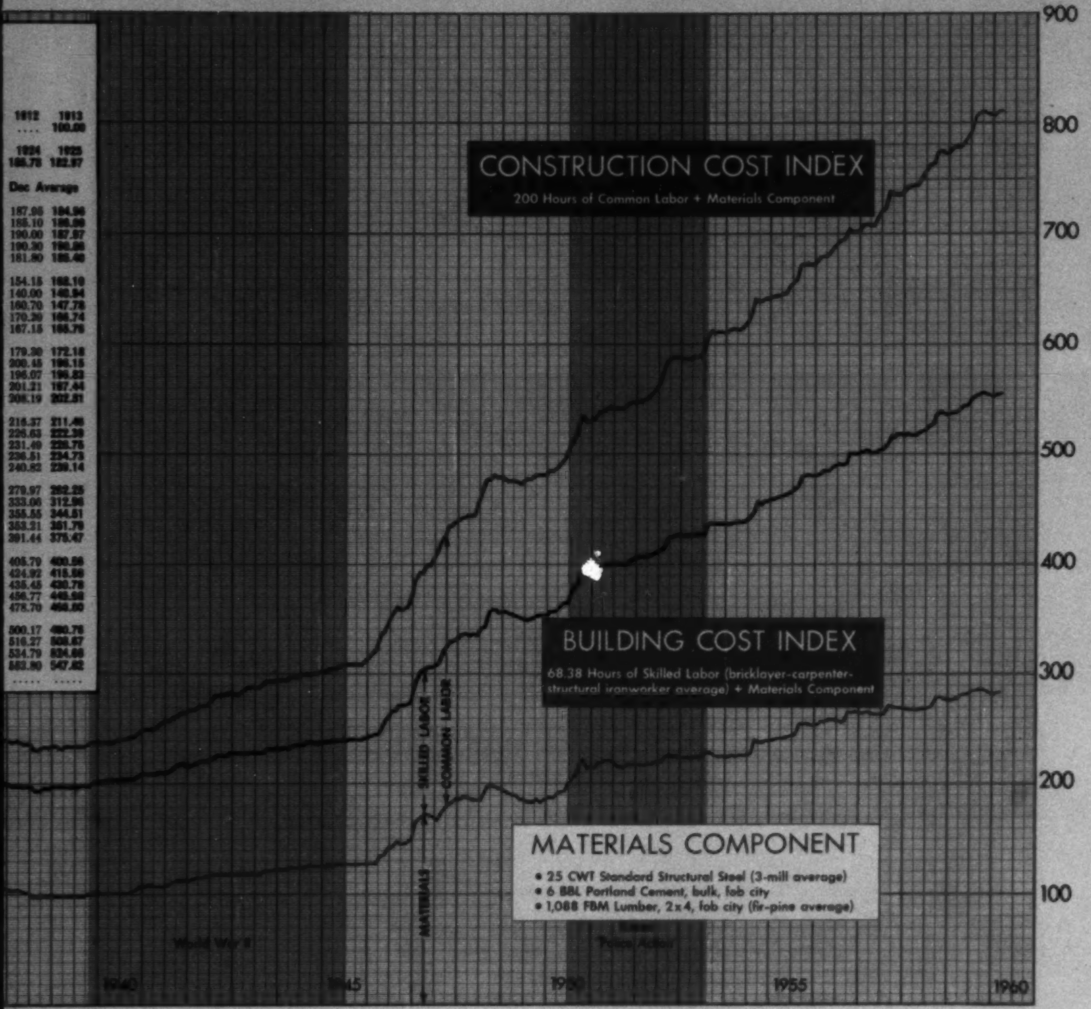
1914	1915	1916	1917	1918	1919	1920	1921	1922	1923
91.91	95.35	130.88	166.79	189.13	188.77	257.23	168.86	164.85	186.86

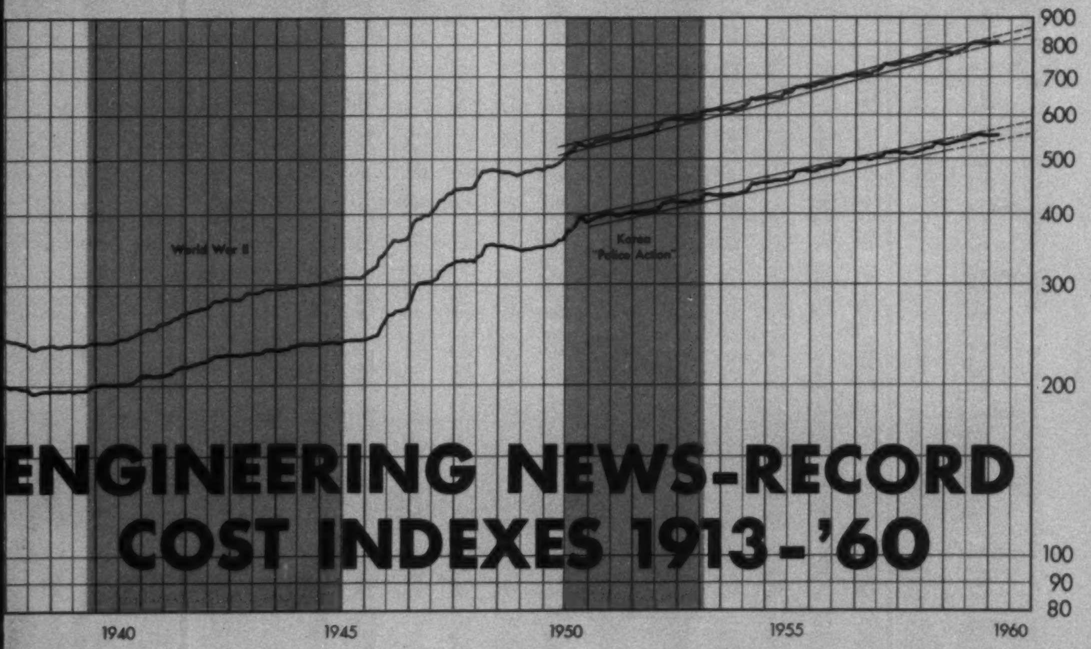
Yr-Mo	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
1926	183.94	183.66	184.25	184.05	183.85	181.80	184.30	185.10	185.10	187.95	187.95
1927	187.80	190.15	187.30	186.00	185.40	185.75	183.85	186.80	184.60	186.60	184.95
1928	185.90	187.15	187.15	188.80	190.10	187.55	187.55	187.55	187.55	187.55	188.80
1929	190.00	190.00	190.00	190.00	191.25	191.95	191.95	192.75	191.55	190.30	190.30
1930	190.30	188.50	189.20	188.80	187.90	185.40	183.25	183.65	182.40	181.80	181.80
1931	180.70	181.95	180.19	177.55	174.55	169.65	164.05	160.10	159.80	158.10	157.40
1932	150.60	147.30	145.88	135.68	136.38	137.58	139.48	139.40	139.60	140.00	139.50
1933	140.82	141.70	140.80	141.50	143.85	143.20	144.30	145.90	154.50	157.05	159.00
1934	160.15	161.30	161.70	163.15	168.15	168.15	168.15	168.40	170.10	170.20	170.20
1935	168.50	165.75	164.10	164.40	163.30	164.85	165.25	166.20	166.05	167.30	167.30
1936	168.25	168.43	169.65	170.00	170.25	170.18	170.85	173.93	174.33	175.33	175.50
1937	185.45	186.55	187.65	194.95	197.15	199.30	199.80	200.65	200.62	201.06	200.30
1938	198.62	198.99	199.29	198.21	197.86	198.22	194.30	194.40	194.80	196.48	196.58
1939	196.24	196.23	196.46	196.45	196.60	196.41	196.78	196.54	196.61	198.50	201.24
1940	201.83	201.80	201.47	201.44	201.17	201.65	201.68	201.71	203.13	204.02	206.24
1941	207.94	208.42	207.88	208.60	209.24	209.41	210.22	212.45	214.86	215.92	216.54
1942	217.12	218.14	218.88	219.55	220.14	221.18	223.45	225.30	225.46	225.90	226.58
1943	226.57	226.90	226.96	227.50	227.64	227.71	227.80	228.40	231.20	231.29	231.39
1944	231.65	232.03	232.32	234.50	234.80	235.33	235.55	236.00	236.00	236.00	236.10
1945	236.51	237.71	237.85	238.46	238.46	239.37	239.64	239.94	240.07	240.35	240.55
1946	242.23	243.94	245.41	254.37	258.06	265.28	267.25	272.29	272.37	273.01	273.99
1947	294.02	301.56	303.28	305.21	304.64	307.42	308.90	317.75	322.56	327.29	329.22
1948	333.56	335.49	334.22	334.56	333.93	339.26	342.42	356.45	356.70	357.07	355.86
1949	354.98	352.94	352.54	351.42	349.92	349.28	349.46	350.85	351.96	353.62	352.91
1950	356.23	356.48	359.96	362.78	364.27	373.39	377.06	383.12	392.81	397.42	390.21
1951	392.99	395.21	399.32	400.06	401.10	400.84	400.24	400.15	400.26	402.43	404.50
1952	405.76	406.19	407.42	407.94	410.30	412.50	414.46	422.36	424.40	424.77	426.04
1953	425.04	425.24	424.80	426.39	426.23	426.21	435.15	436.86	435.96	435.99	435.95
1954	436.42	437.09	436.71	437.48	438.24	439.67	444.06	455.54	454.28	455.54	456.34
1955	457.91	460.43	460.63	460.62	462.55	464.82	467.83	478.03	479.15	479.99	479.30
1956	480.45	483.05	483.14	485.56	487.26	488.70	490.23	491.22	500.10	499.54	500.48
1957	501.96	503.09	501.37	501.37	503.01	504.17	506.62	516.90	516.12	518.78	516.81
1958	516.79	515.78	516.00	516.61	518.62	521.09	524.29	525.62	535.02	536.53	534.96
1959	536.23	537.25	540.32	542.93	544.44	546.25	551.74	554.31	555.88	555.40	554.19
1960	554.40	555.43	.....	.....	.....	.....	.....	.....	.....	.....	.....



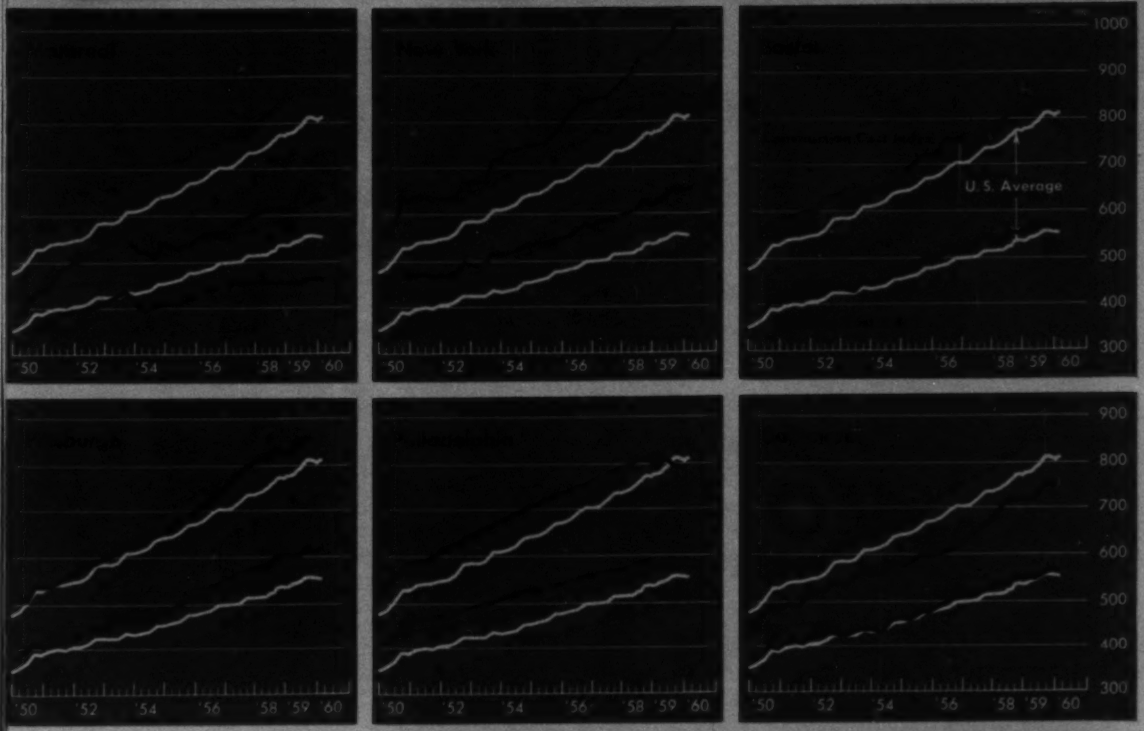


1912	1913
.....	100.00
1924	1925
185.78	182.97
Dec Average	
187.98	184.96
186.10	186.09
190.00	187.97
190.30	190.86
181.80	185.40
154.15	168.10
140.90	148.94
160.70	147.78
170.30	166.74
167.15	165.76
179.30	172.18
200.45	196.15
196.07	196.83
201.21	197.44
206.19	202.81
216.37	211.46
225.63	222.30
231.49	228.75
236.51	234.73
240.82	236.14
279.97	262.25
333.06	312.96
355.55	344.51
353.21	351.79
391.44	375.47
405.70	400.56
424.92	415.58
435.45	430.78
456.77	448.98
478.70	468.00
500.17	490.76
516.27	508.67
534.79	524.66
563.80	547.82
.....	.....

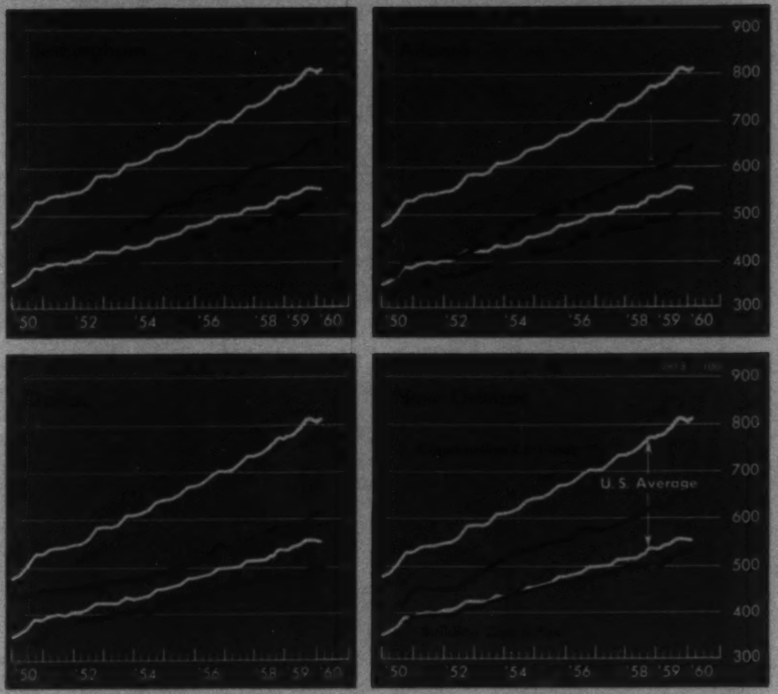




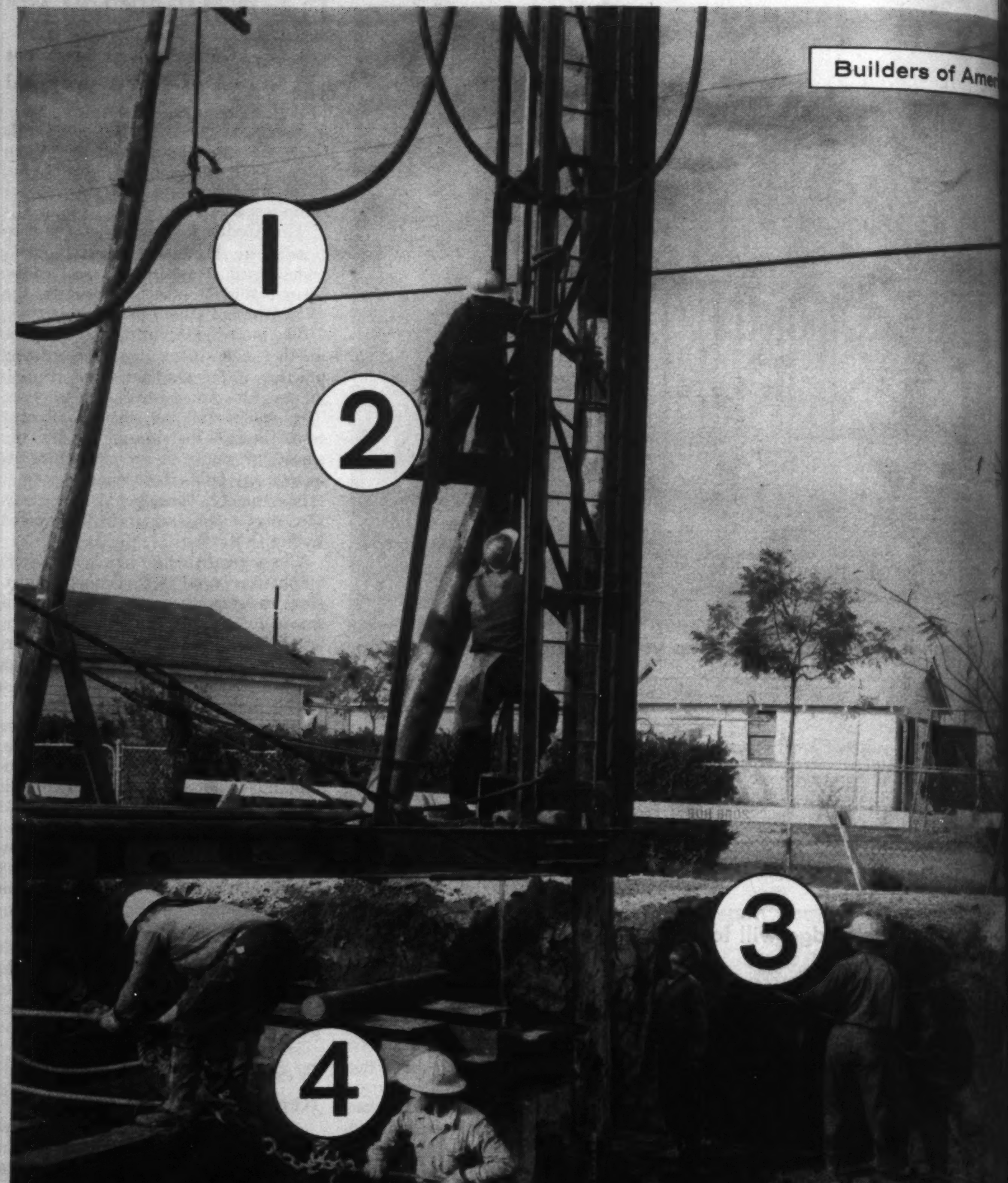
ENGINEERING NEWS-RECORD COST INDEXES 1913-'60



U. S. -CITIES VERAGE		CANADA			
		MONTREAL		TORONTO	
n-sion	Building	Construction	Building	Construction	Building
8	357	406	314	...	...
8	356	408	316	...	...
5	353	407	315	...	...
4	349	408	316	...	...
0	352	396	316	...	...
0	353	394	314	...	...
8	380	397	317	...	...
7	373	397	317	...	...
1	393	428	346	...	...
1	391	427	345	...	...
0	399	445	383	...	...
3	401	473	378	...	...
4	400	484	355	...	...
8	406	484	385	...	...
1	407	500	383	...	...
2	413	510	393	...	...
7	424	512	395	...	...
8	425	512	395	...	...
8	425	516	399	...	...
4	426	516	399	...	...
11	436	550	430	...	...
11	435	550	430	...	...
14	437	516	396	...	...
22	440	513	393	...	...
40	454	511	393	...	...
43	457	542	422	...	...
46	460	528	408	543	444
56	465	525	405	543	449
73	479	532	412	538	436
73	479	550	427	544	432
80	483	552	429	558	446
92	499	560	437	562	450
705	500	560	437	592	455
704	500	561	438	595	450
709	501	560	437	596	462
721	504	586	451	611	469
738	516	587	452	606	468
738	516	591	453	600	471
744	516	584	446	607	470
757	521	603	449	605	468
773	535	603	449	622	469
774	535	604	449	638	479
781	540	603	449	642	483
795	545	610	450	671	500
813	556	620	457	666	497
809	553	630	450	657	488
813	555	630	450	676	498



ENR Cost Indexes By Region And City


1
2
3
4

American Mutual means Better Protection . . . Lower Cost

Just driving piles—but think of the injuries if . . .

1. Steam hose breaks
2. Man springing pile gets struck
3. Earth bank caves
4. Hauling cable snaps

How can driving piles drive profits down? Easily, if you take the job for granted and overlook hazards that may cause injury.

How can you be reasonably sure you're taking proper safety measures? That's easy too. Call in the American Mutual Safety Engineer *before* you begin work.

The A$_M$ Safety Engineer studies your project, searches out potential dangers, consults with the contractor and his superintendent, and suggests safety measures for the protection of workers and equipment.

Result: Safety counseling that helps you realize fewer accidents . . . fewer work stoppages . . . lower expenditures for workmen's compensation insurance. Jobs finished on schedule . . . greater profits for contractors . . . more favorable bids on future contracts.

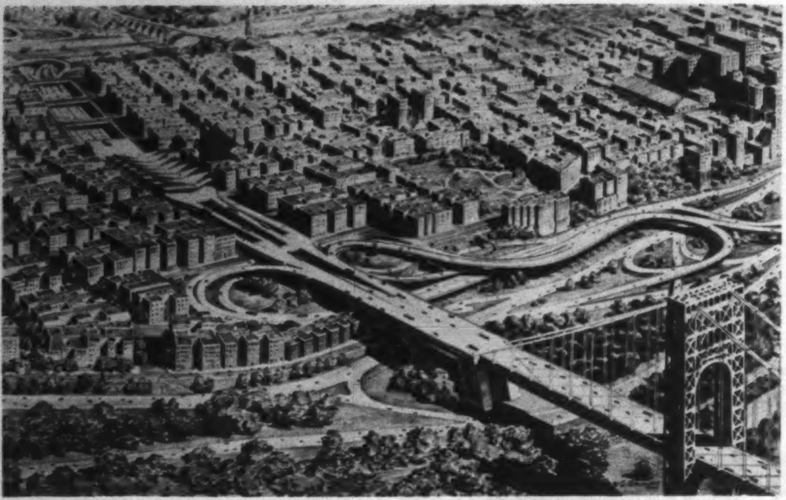
All very good reasons to call on the A$_M$ man for your many casualty insurance needs! American Mutual Liability Insurance Company, Dept. EN-2, Wakefield, Massachusetts.

Our business is protecting your business . . . better

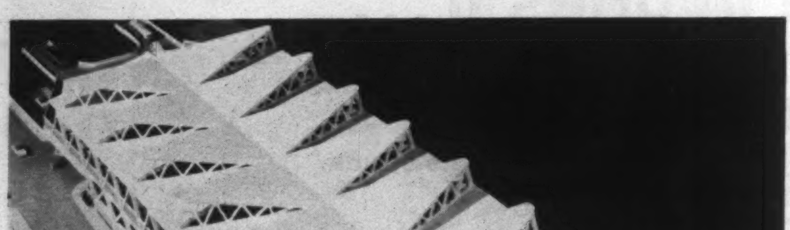
"The First American Liability Insurance Company" . . . a writer of Workmen's Compensation, all forms of Liability, Crime, Automobile, Group Accident and Health Insurance.

American Mutual

LIABILITY INSURANCE COMPANY



At New York End of Bridge . . .



. . . Nervi Designs a Bus Station

The $13-million George Washington Bridge Bus Station will be New York's first building designed by Pier Luigi Nervi, world-famed Italian architect-engineer. The three-level, 400x185-ft structure will straddle a depressed expressway linking with the lower-deck roadway of the George Washington Bridge (ENR Jan. 28, p. 44).

Foundations for the bus station were built with the expressway retaining walls. A contract for the building's superstructure will be let this spring. Scheduled completion date is 1962.

The concrete roof comprises 26 triangular sections, spanning the 185-ft width of the building across a single line of interior columns. Fourteen of these roof sections slope upward from the center columns. Each 92x66-ft triangular section contains 36 precast panels.

The sides of the raised roof sections and the building walls have triangular openings formed by precast concrete members. These openings will provide ventilation of the bus platforms at the upper floor level and the expressway below.

The bus station will replace and consolidate scattered terminals and sidewalk stations for 2,000 buses serving 50,000 New Jersey commuters. It will also furnish underground access to the north-south Manhattan subway lines.

It is part of the George Washington Bridge lower-level project. The Port of New York Authority has awarded contracts on this project totaling $58.4 million.

LA Wharf Burns

Fire destroys terminal just before dedication

Fire whipped along 1,700 ft of wharf in Los Angeles Harbor last week destroying the Matson Navigation Co.'s $1.85-million container terminal (ENR Mar. 17, p. 27) and leaving an estimated total loss of $2 million to $2.5 million.

An investigation is under way to determine the cause. One report says the blaze was touched off by sparks from a welder's torch. Welding had been in progress at the base of the terminal's giant gantry crane, where firemen determined the fire started.

The fire licked along the timber wharf and spread to a nearby lumber barge, destroying the barge itself and 70,000 board-feet of creosote-impregnated pilings it contained. A concrete warehouse at wharfside was also damaged.

The terminal would have marked the harbor's entry into the age of push-button loading of containerized cargoes. It was to be dedicated April 15 and assigned to the Matson Steamship Co. It is estimated that the fire will push the project back at least a year.

Early efforts to control the blaze were frustrated when the fire spread to wood piling beneath the pier. For a while the fire threatened to topple the 125-ft, 350-ton crane.

The Matson wharf was being built for the harbor by Pugh Construction Corp., San Pedro, Calif.

May Opening Date Set for Spring Creek Tunnel Bids

The Bureau of Reclamation will open bids May 5 for construction of Spring Creek power conduit on the Central Valley Project in northern California.

The conduit will comprise two sections of 18.5-ft-dia tunnel 8,620 and 4,400 ft long and a 17-ft-dia section of siphon 3,100 ft long. It will run from Whiskeytown Dam, to be started this year on Clear Creek, to existing Keswick Reservoir on the Sacramento River.

It will complete 15 miles of tunnel in a system to transfer water from the Trinity River, which flows into the Pacific about 30 miles from the Oregon border, to the Sacramento, which waters the rich agricultural land in the Central Valley. Other major units in the system are: Trinity Dam, on the Trinity River, over 80% complete; Lewiston diversion dam, Trinity River, not started; Clear Creek Tunnel, from Lewiston Dam to Whiskeytown Dam, over two-thirds finished.

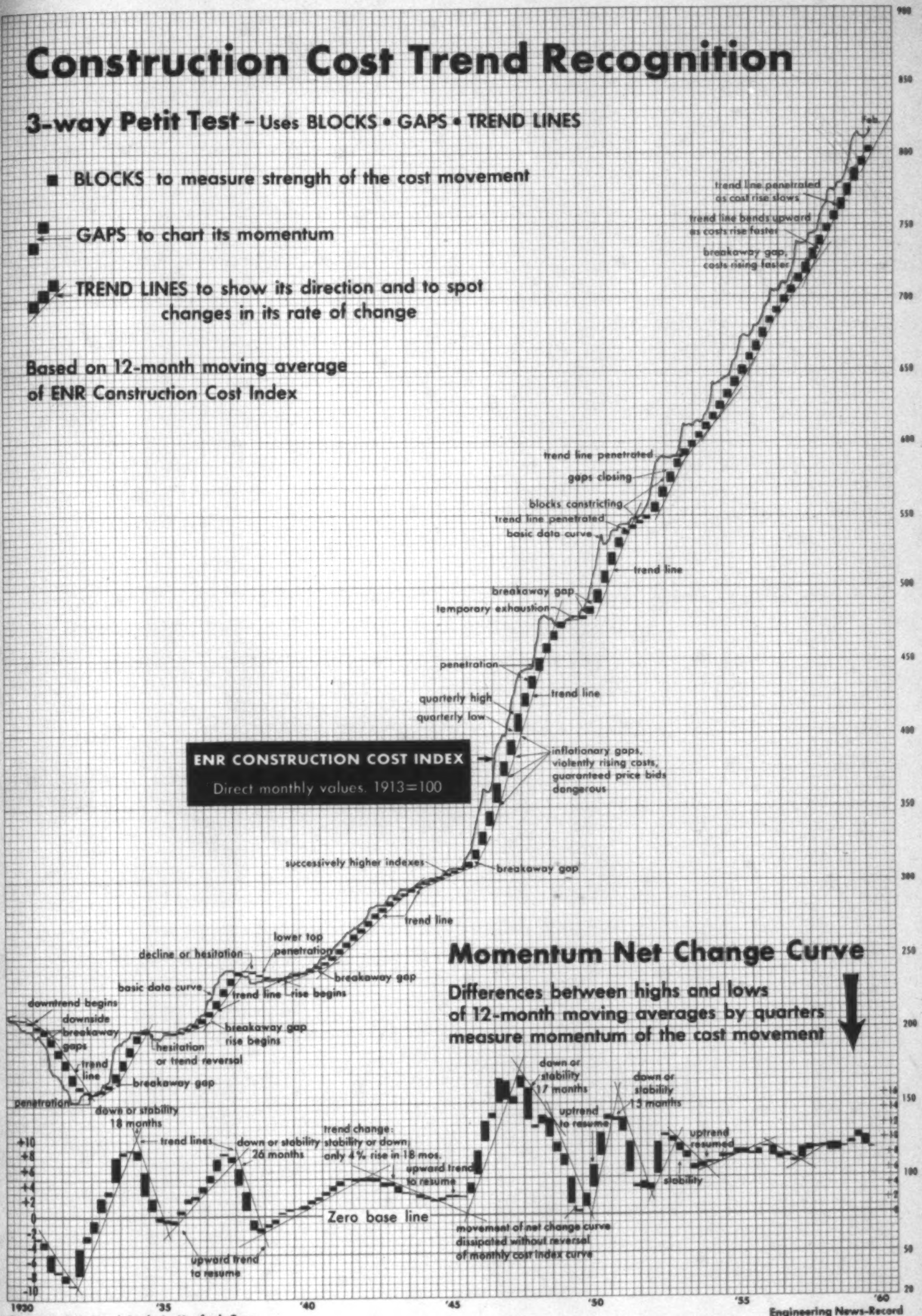
Bidding and supervision are under the Bureau of Reclamation's Trinity River Division, with headquarters in Lewiston, Calif.

Construction Cost Trend Recognition

3-way Petit Test – Uses BLOCKS • GAPS • TREND LINES

- ■ BLOCKS to measure strength of the cost movement
- GAPS to chart its momentum
- TREND LINES to show its direction and to spot changes in its rate of change

Based on 12-month moving average of ENR Construction Cost Index



Momentum Net Change Curve

Differences between highs and lows of 12-month moving averages by quarters measure momentum of the cost movement

George H. Petit Trend Analysis, Hartford, Conn.

Engineering News-Record

Supplement to Engineering News-Record, March 24, 1960. Business News Department, Engineering News-Record, 330 W. 42nd St., P.O. Box 89, Times Sq. Sta., New York 36, N.Y. Reprints are available at 50 cents each. Multicopy rates on request.

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Engineering News-Record 20-Cities Cost Indexes 1913=100

CONSTRUCTION COST INDEX

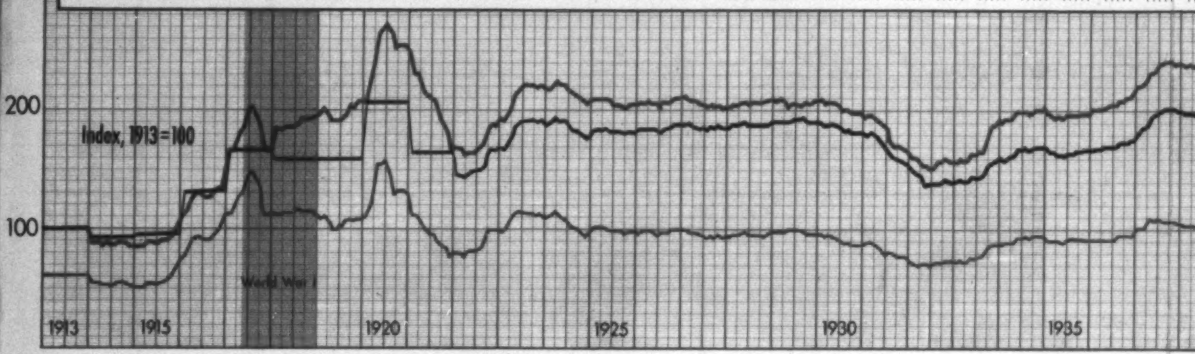
Year:	1903	1904	1905	1906	1907	1908	1909	1910	1911	1912	1913
	93.90	87.40	90.55	95.10	100.55	97.20	90.92	96.33	93.43	90.70	100.00
	1914	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**	**1923**	**1924**	**1925**
	88.56	92.58	129.58	181.24	189.20	198.42	251.28	201.82	174.45	214.12	215.36	206.68

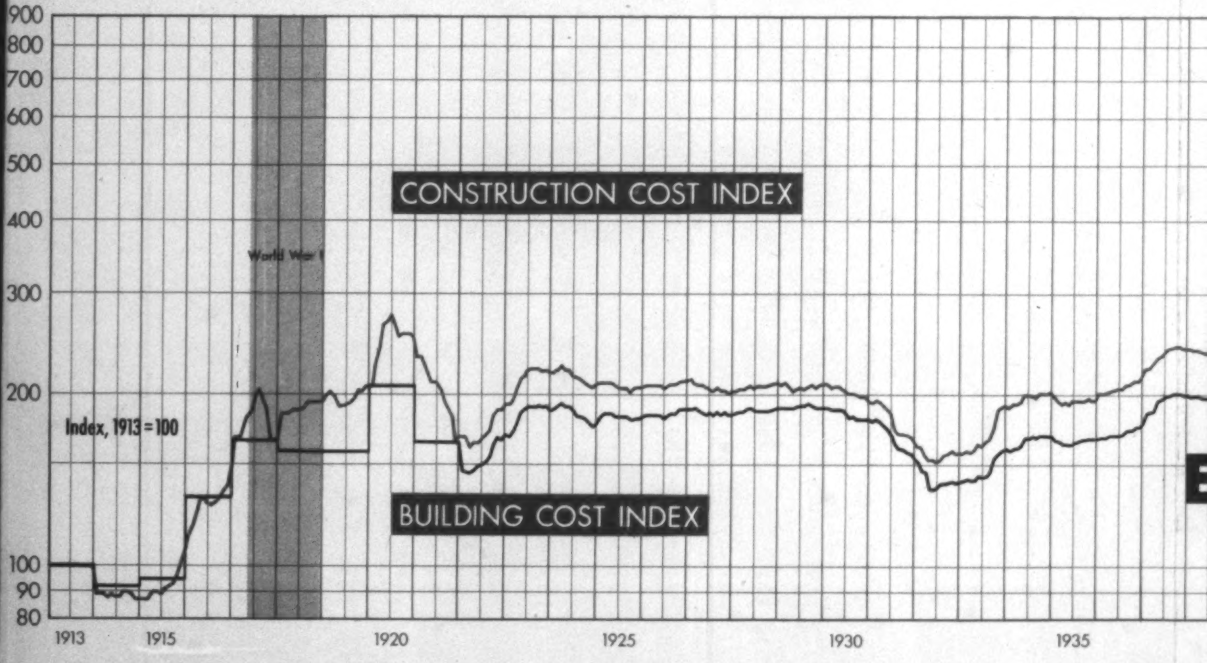
Yr-Mo	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Average
1926	207.15	206.55	207.65	207.05	207.30	204.80	207.80	208.30	208.30	209.80	210.80	210.80	208.03
1927	211.50	210.15	208.80	209.00	206.80	205.55	203.68	205.50	203.60	204.40	201.98	203.90	206.24
1928	203.90	204.65	204.65	206.40	207.00	206.15	206.65	207.29	207.29	207.71	209.46	210.16	206.78
1929	209.40	210.40	207.78	203.40	205.15	205.65	204.77	205.91	207.57	206.32	208.46	209.46	207.02
1930	208.96	206.46	206.80	207.12	205.86	203.36	200.95	200.95	199.58	198.72	198.54	196.86	202.85
1931	194.48	196.61	194.51	191.63	189.33	187.23	174.37	171.38	171.40	169.78	169.28	166.23	181.35
1932	162.48	161.82	157.24	153.12	152.78	152.20	153.36	156.80	157.96	159.16	158.20	158.46	156.97
1933	158.44	159.30	158.44	160.16	164.39	163.41	165.50	167.00	175.48	187.74	190.14	192.14	170.18
1934	191.26	194.06	194.06	195.86	199.61	199.61	199.65	198.40	200.58	200.86	201.36	201.86	198.10
1935	198.22	195.07	194.41	194.65	193.96	196.73	197.43	197.45	197.30	197.50	197.35	197.20	196.44
1936	201.23	201.33	201.63	202.80	204.05	205.08	204.80	208.48	208.88	211.53	211.50	215.70	206.42
1937	221.20	222.05	224.75	231.35	233.45	237.25	239.90	240.65	241.62	241.90	241.40	241.05	234.71
1938	239.62	238.99	238.79	237.95	236.80	236.86	232.29	232.39	232.70	234.30	234.40	234.89	235.83
1939	234.72	234.31	234.43	234.86	234.69	235.02	234.94	234.90	234.97	236.86	238.20	238.17	235.51
1940	238.34	238.32	238.29	238.26	238.86	241.59	242.15	242.18	244.13	245.02	247.24	249.12	241.96
1941	249.69	250.50	250.71	252.40	255.55	256.79	258.18	260.41	263.12	264.46	266.13	266.16	257.84
1942	267.63	269.41	269.71	271.78	272.30	274.19	277.65	281.61	281.61	282.44	283.64	283.69	276.30
1943	283.45	283.48	285.24	288.80	289.87	289.94	289.92	291.38	294.09	294.31	294.41	294.51	289.95
1944	294.57	295.05	295.34	297.70	298.00	298.72	299.94	300.42	300.46	301.06	301.09	302.30	298.72
1945	302.50	303.70	304.50	306.43	307.43	308.99	308.99	309.08	309.28	309.28	309.28	313.48	307.75
1946	316.32	319.52	323.83	334.59	339.69	348.72	354.70	361.37	360.19	360.94	362.47	369.30	345.98
1947	386.97	393.73	395.45	399.56	399.98	406.63	413.75	422.85	426.38	434.58	436.91	441.13	413.24
1948	441.65	442.67	443.60	443.64	444.86	455.80	464.83	477.11	478.40	480.21	478.25	477.66	460.72
1949	477.41	475.37	474.80	474.34	472.10	473.78	477.46	478.28	479.78	480.54	480.02	480.32	477.02
1950	484.74	484.85	488.35	491.94	496.55	506.88	512.67	521.36	530.97	536.23	530.01	530.83	509.62
1951	532.53	538.60	539.83	540.57	543.53	543.37	542.94	543.46	543.57	547.11	547.56	548.27	542.65
1952	548.43	549.86	551.20	554.72	557.71	562.29	571.25	584.29	586.68	589.03	589.21	588.09	569.40
1953	587.87	587.79	588.04	590.07	589.57	593.71	604.64	612.55	610.89	611.64	611.80	611.30	599.99
1954	614.06	614.73	614.01	615.38	618.71	621.91	628.26	641.68	640.18	641.49	642.42	642.71	627.96
1955	643.72	645.24	645.70	647.49	653.26	655.96	660.09	672.24	672.74	673.89	673.20	673.13	659.72
1956	676.36	680.21	680.20	683.28	688.43	692.13	694.75	696.31	704.91	703.88	704.13	703.82	692.37
1957	707.90	710.06	708.64	709.30	715.70	721.36	724.15	738.63	737.78	737.14	737.43	738.08	723.85
1958	743.44	743.77	744.41	745.78	751.57	757.31	762.52	764.44	773.47	775.30	774.12	773.81	759.16
1959	778.28	778.75	781.35	784.41	790.37	795.16	806.69	811.15	812.56	811.40	809.78	808.63	797.38
1960	812.03	812.93	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

BUILDING COST INDEX

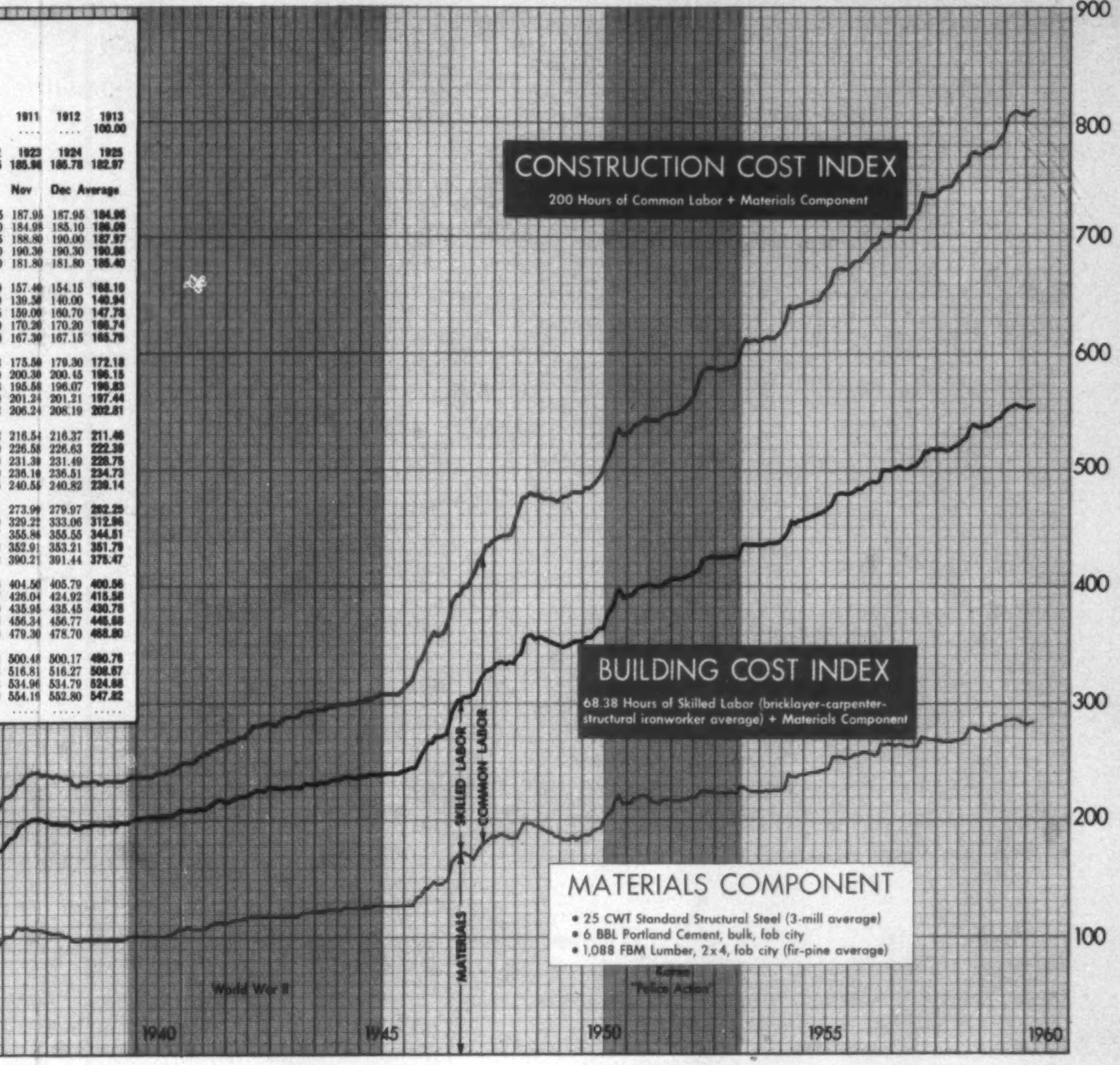
Year:	1903	1904	1905	1906	1907	1908	1909	1910	1911
	....	....	....	....	....	....	....	....	....
	1914	**1915**	**1916**	**1917**	**1918**	**1919**	**1920**	**1921**	**1922**	**1923**
	91.91	95.28	130.88	166.79	159.10	158.77	207.23	166.05	154.85	185.98

Yr-Mo	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov
1926	183.94	183.65	184.25	184.05	183.55	181.80	184.30	185.10	185.10	187.95	187.95
1927	187.80	189.15	187.30	186.00	185.40	185.75	183.88	186.50	184.60	186.60	184.98
1928	185.90	187.15	187.15	188.80	190.10	187.55	187.55	187.55	187.55	187.55	188.80
1929	190.00	190.00	190.00	190.00	191.25	191.95	191.95	192.75	191.55	190.30	190.30
1930	190.30	188.50	189.20	188.80	187.90	185.40	183.25	183.65	182.40	181.80	181.80
1931	180.70	181.95	180.19	177.55	174.55	169.65	164.05	160.10	159.50	158.10	157.40
1932	150.60	147.20	145.88	135.68	136.38	137.58	139.48	139.40	139.60	140.00	139.30
1933	140.82	141.70	140.80	141.50	143.85	143.20	144.30	145.90	154.50	157.05	150.00
1934	160.15	161.30	161.70	163.15	168.15	168.15	169.15	168.40	170.10	170.20	170.20
1935	166.50	165.75	164.10	164.40	163.30	164.85	165.25	166.20	166.05	167.30	167.30
1936	168.25	168.43	169.68	170.00	170.35	170.18	170.85	173.93	174.33	175.33	175.50
1937	185.45	186.55	187.65	194.95	197.15	199.20	199.80	200.65	200.62	201.00	200.30
1938	198.62	198.99	199.29	198.21	197.86	198.22	194.39	194.49	194.80	195.48	195.58
1939	196.24	196.23	196.46	196.45	196.60	196.41	196.78	196.54	196.61	198.50	201.24
1940	201.52	201.50	201.47	201.44	201.17	201.65	201.68	201.71	203.13	204.02	206.24
1941	207.94	208.42	207.88	208.60	209.24	209.41	210.22	212.45	214.58	215.92	216.54
1942	217.12	218.44	218.88	219.55	220.14	221.18	223.45	225.39	225.46	225.90	226.58
1943	226.87	226.90	226.66	227.50	227.64	227.71	227.89	228.49	231.20	231.29	231.39
1944	231.55	232.03	232.32	234.50	234.80	235.33	235.55	236.09	236.00	236.00	236.10
1945	236.51	237.71	237.85	238.46	238.46	239.37	239.64	239.94	240.07	240.35	240.55
1946	242.23	243.94	245.41	254.37	258.06	265.28	267.25	272.29	272.37	273.01	273.99
1947	294.62	301.56	303.28	305.21	304.64	307.42	308.90	317.75	322.58	327.29	329.22
1948	333.58	335.49	334.22	334.56	333.93	339.26	342.42	355.45	356.70	357.07	355.86
1949	354.98	352.94	352.54	351.42	348.92	349.28	349.46	350.85	351.98	353.02	352.91
1950	356.23	356.48	359.98	362.78	364.27	373.39	377.66	383.12	392.81	397.42	390.21
1951	392.99	398.21	399.32	400.06	401.10	400.84	400.34	400.15	400.26	403.43	404.56
1952	405.76	406.19	407.42	407.94	410.30	412.50	414.46	422.36	424.40	424.77	426.04
1953	425.04	425.24	424.89	426.39	426.23	426.21	435.15	436.86	435.98	435.99	435.98
1954	436.42	437.09	436.71	437.48	438.24	439.67	444.05	455.54	454.28	455.54	456.34
1955	457.91	459.43	459.63	460.62	462.55	464.82	467.52	478.03	479.15	479.99	479.30
1956	480.48	483.08	483.14	485.56	487.36	488.70	489.23	491.22	500.10	499.54	500.48
1957	501.96	502.59	501.37	501.37	503.01	504.17	506.62	516.90	516.12	516.78	516.81
1958	516.79	515.78	516.09	516.61	518.62	521.09	524.29	525.62	535.02	536.53	534.96
1959	536.23	537.25	540.32	542.93	544.44	548.35	551.74	554.31	555.88	555.40	554.19
1960	554.40	555.43	.....	.....	.....	.....	.....	.....	.....	.....	.....





1911	1912	1913
.....	.....	100.00
1923	1924	1925
185.96	186.78	182.97
Nov	Dec	Average
187.95	187.95	184.96
184.98	185.10	186.09
188.80	190.00	187.97
190.30	190.30	190.86
181.80	181.80	185.40
157.40	154.15	168.10
139.58	140.00	140.94
159.00	160.70	147.78
170.20	170.20	166.74
167.30	167.15	165.78
175.50	179.30	172.18
200.30	200.45	196.15
195.58	196.07	196.83
201.24	201.21	197.44
206.24	208.19	202.81
216.54	216.37	211.46
226.58	226.63	222.39
231.30	231.49	228.75
236.10	236.51	234.73
240.55	240.82	239.14
273.99	279.97	262.25
329.22	333.06	312.96
355.86	355.55	344.51
352.91	353.21	351.79
390.21	391.44	375.47
404.50	405.79	400.56
426.04	424.92	415.56
435.95	435.45	430.78
456.34	456.77	445.68
479.30	478.70	468.80
500.48	500.17	490.76
516.81	516.27	508.67
534.96	534.79	524.68
554.19	552.80	547.82
.....	.....	.....



CONSTRUCTION COST INDEX

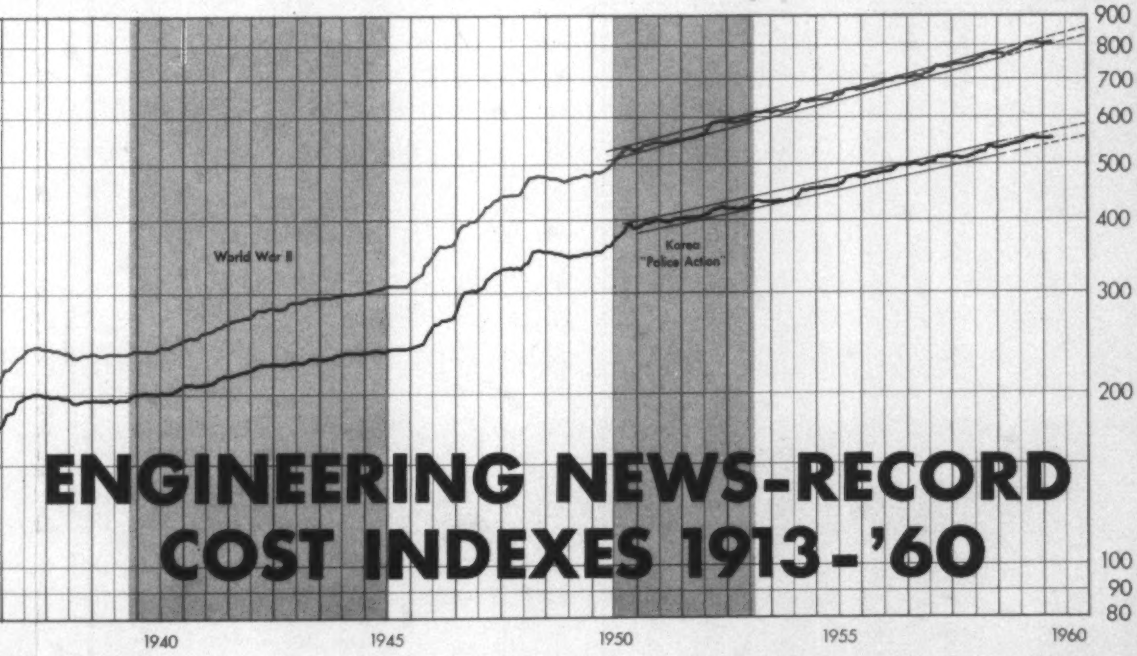
200 Hours of Common Labor + Materials Component

BUILDING COST INDEX

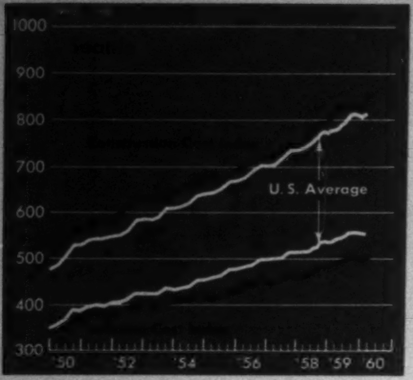
68.38 Hours of Skilled Labor (bricklayer-carpenter-structural ironworker average) + Materials Component

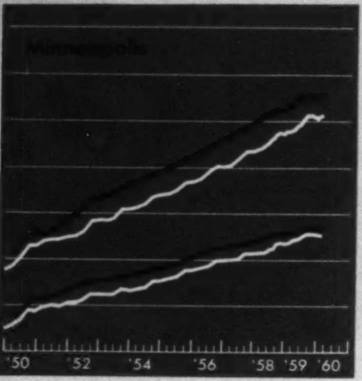
MATERIALS COMPONENT

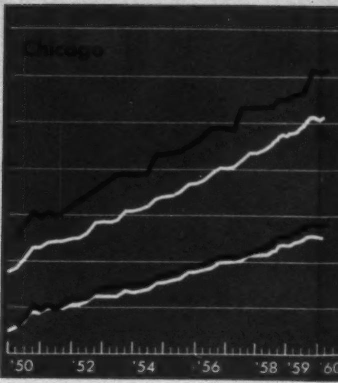
- 25 CWT Standard Structural Steel (3-mill average)
- 6 BBL Portland Cement, bulk, fob city
- 1,088 FBM Lumber, 2x4, fob city (fir-pine average)

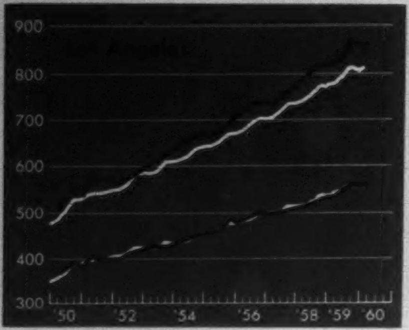


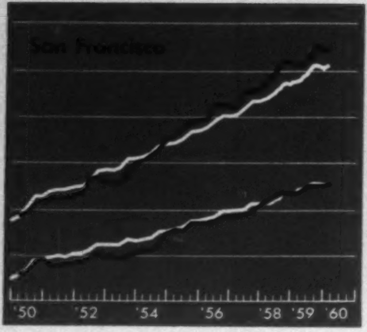
ENGINEERING NEWS-RECORD COST INDEXES 1913-'60

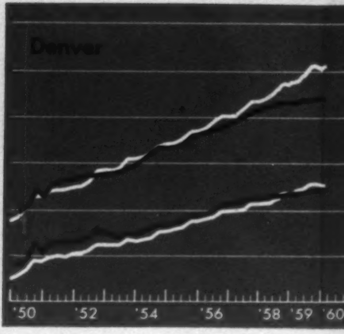






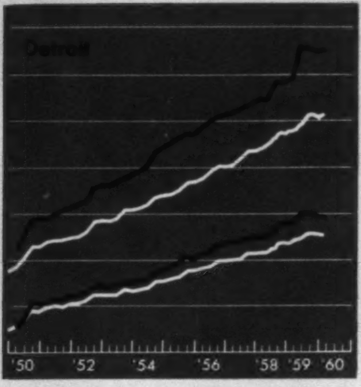


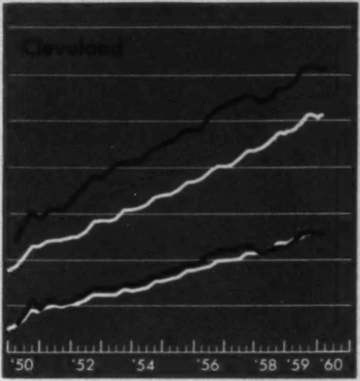


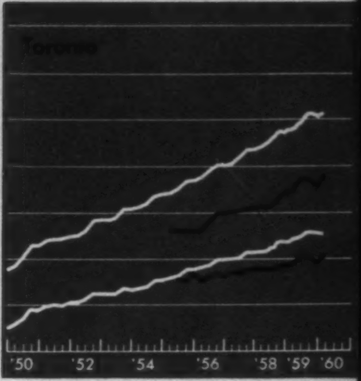


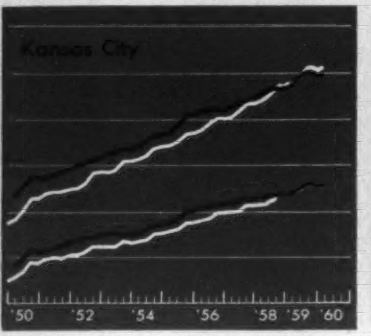
Engineering News-Record CONSTRUCTION AND BUIL

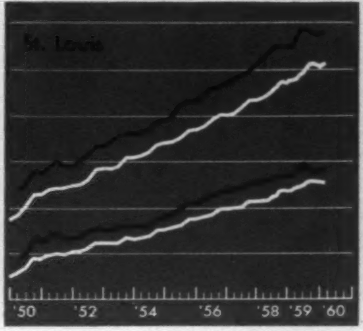
	FAR WEST						MISSISSIPPI TO THE ROCKIES										MID		
	LOS ANGELES		SAN FRANCISCO		SEATTLE		DALLAS		DENVER		KANSAS CITY		ST. LOUIS		MINNEAPOLIS		CHICAGO		DETRO
Yr-Mo	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction
1948 Sept...	511	368	490	350	512	328	398	322	499	369	500	366	542	385	512	370	537	360	511
Dec...	495	356	484	347	512	328	398	322	496	365	500	367	542	391	510	368	530	353	500
1949 Mar...	482	343	478	341	530	328	398	322	482	351	484	352	527	386	504	361	527	350	501
June...	478	339	478	341	530	328	398	322	482	351	501	357	508	375	504	361	526	349	489
Sept...	489	336	483	341	530	340	394	316	470	359	511	357	524	379	512	361	541	352	514
Dec...	494	340	483	345	530	341	397	318	470	359	511	357	522	377	512	363	542	353	515
1950 Mar...	511	360	486	352	534	344	422	322	491	378	528	374	529	384	516	377	550	361	521
Jun....	529	380	495	361	548	358	423	323	506	395	551	390	552	396	538	389	584	381	555
Sept...	552	392	513	383	564	374	423	323	541	423	571	410	579	431	555	406	607	404	583
Dec...	537	377	519	389	563	374	438	338	528	400	570	406	569	421	562	413	593	391	592
1951 Mar...	580	403	518	375	586	384	437	362	552	426	570	406	585	432	557	408	603	401	592
Jun...	572	395	533	380	586	384	437	362	558	432	575	411	597	436	587	421	598	395	602
Sept...	558	381	525	377	593	389	437	371	564	423	586	417	584	422	587	423	620	403	601
Dec...	569	398	527	379	592	383	437	371	564	425	586	417	587	427	592	438	624	413	601
1952 Mar...	565	394	532	383	606	389	437	371	571	431	586	431	587	429	593	438	626	415	621
Jun...	574	407	565	386	620	389	437	371	572	433	588	434	608	444	593	438	626	416	625
Sept...	610	415	573	401	635	400	455	382	577	452	623	446	629	448	628	450	661	432	656
Dec...	610	415	559	390	635	400	455	382	612	462	623	446	628	447	628	454	661	433	663
1953 Mar...	610	420	557	391	635	400	455	382	602	452	623	446	627	446	628	454	661	433	663
Jun...	612	421	556	390	636	401	463	387	582	434	623	452	648	446	655	459	690	443	663
Sept...	627	420	587	397	636	402	470	397	604	449	630	442	653	457	661	468	691	443	687
Dec...	626	419	600	400	643	402	482	405	595	441	630	442	654	455	661	468	690	443	682
1954 Mar...	634	428	602	402	664	412	470	393	595	441	635	446	655	455	661	468	692	445	685
Jun...	640	433	617	407	665	413	465	390	597	443	645	450	669	457	681	473	693	449	700
Sept...	665	448	631	423	682	419	487	405	633	468	661	466	684	473	697	491	734	467	729
Dec...	667	452	649	443	676	414	484	402	632	467	663	466	687	477	697	492	734	468	729
1955 Mar...	667	453	658	447	676	414	484	402	635	470	665	468	693	482	697	492	736	469	743
Jun...	672	457	676	445	681	418	488	406	637	474	686	479	720	495	711	493	741	477	763
Sept...	705	483	690	469	693	436	507	422	656	485	703	496	728	503	720	502	752	488	776
Dec...	708	479	684	463	685	428	510	426	653	483	703	496	727	502	720	502	762	486	772
1956 Mar...	714	485	693	471	715	439	512	428	655	487	707	499	757	523	721	503	769	493	778
Jun...	733	491	726	478	720	444	509	424	670	488	711	498	756	522	747	515	788	500	800
Sept...	736	497	727	483	724	452	534	446	680	503	722	509	761	527	757	526	792	507	810
Dec...	731	494	722	484	722	450	534	449	696	519	715	503	759	525	757	526	790	506	808
1957 Mar...	731	494	720	485	746	452	525	439	697	523	715	505	760	529	758	527	789	504	809
Jun...	731	496	758	486	749	456	525	439	702	510	735	503	789	538	781	530	831	511	823
Sept...	778	508	763	497	756	467	547	451	710	522	742	516	796	546	788	537	838	530	832
Dec...	778	513	761	506	747	458	547	451	710	522	742	516	796	546	788	537	836	528	831
1958 Mar...	773	507	758	503	785	466	547	451	725	523	742	517	814	552	803	537	835	527	852
Jun...	814	514	798	507	789	470	553	459	725	525	762	527	840	558	818	548	838	535	852
Sept...	822	527	820	533	799	484	573	469	731	530	768	533	849	567	825	554	857	560	889
Dec...	824	530	812	533	799	484	573	469	731	532	768	533	844	563	824	553	859	562	892
1959 Mar...	828	536	817	538	830	493	573	472	731	532	773	538	854	576	839	554	866	569	897
Jun...	839	552	824	550	836	499	573	474	742	537	793	548	891	590	855	564	875	578	962
Sept...	877	560	858	551	839	508	604	490	742	540	803	558	880	579	860	569	923	586	962
Dec...	868	554	850	549	831	500	604	490	747	545	798	553	874	573	859	569	918	581	959
1960 Feb...	870	556	853	553	862	504	604	491	744	542	798	553	882	581	860	570	920	583	960

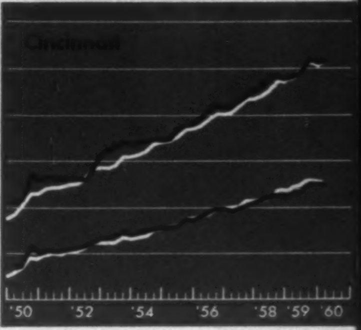








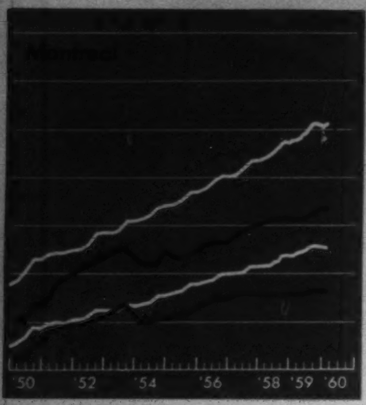


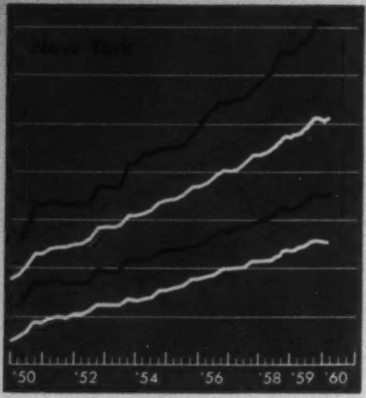


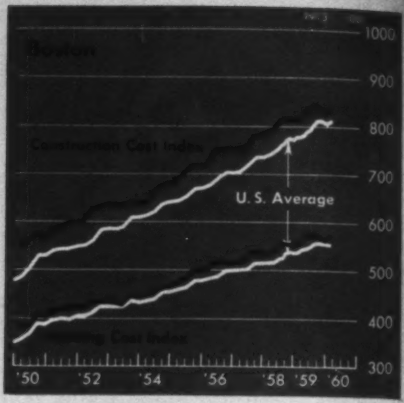
BUILDING COST INDEXES IN 22 CITIES, 1913=100

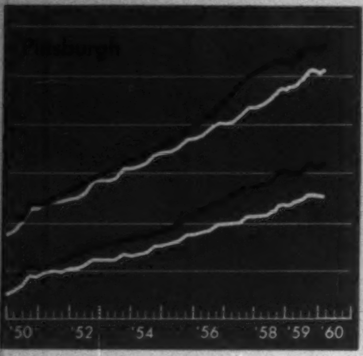
MIDDLE WEST						SOUTH						MIDDLE ATLANTIC								NEW ENGLAND	
DETROIT		CINCINNATI		CLEVELAND		ATLANTA		BIRMINGHAM		NEW ORLEANS		PITTSBURGH		BALTIMORE		PHILADELPHIA		NEW YORK		BOSTON	
Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building	Construction	Building
511	358	505	374	535	352	325	302	378	320	350	302	470	376	462	375	470	394	549	403	513	363
500	347	505	374	523	339	345	308	379	321	354	310	502	384	462	387	467	391	541	395	508	357
501	348	490	358	520	337	345	308	379	326	379	325	502	384	462	387	462	386	537	400	507	357
489	336	487	358	514	332	345	308	389	329	379	325	492	375	425	349	492	394	534	398	526	362
514	351	496	362	525	342	345	309	389	330	379	325	492	375	424	354	517	394	533	397	525	361
515	351	496	362	530	349	345	313	377	319	379	325	492	377	424	351	515	392	539	402	532	372
521	357	502	360	537	356	354	316	381	321	383	329	497	382	427	354	518	397	546	410	536	375
555	376	510	368	578	379	354	316	381	321	402	340	499	387	462	375	541	415	575	439	556	379
583	404	568	406	605	406	394	339	388	328	408	346	532	401	479	391	556	430	632	464	570	396
592	400	553	392	587	388	390	339	413	345	438	376	529	397	474	387	575	449	622	459	563	392
592	402	559	400	607	402	395	339	416	351	441	379	531	400	486	398	575	449	630	466	576	404
602	411	556	398	606	402	395	339	416	351	439	377	531	400	488	403	575	449	627	463	586	407
601	410	543	395	603	399	395	339	416	351	434	379	551	405	482	398	582	456	621	457	590	412
601	416	548	401	626	403	395	351	416	353	435	379	557	416	513	413	582	461	626	462	588	410
621	419	547	400	625	403	395	351	417	355	435	379	557	416	510	410	601	462	623	460	590	411
625	424	553	406	685	419	395	353	417	358	437	381	577	416	511	414	616	472	629	465	614	422
656	439	612	423	684	431	397	364	450	372	466	397	607	427	530	420	636	477	667	487	630	426
663	438	609	420	682	428	402	371	450	372	466	397	607	439	526	416	636	480	665	484	629	425
663	438	609	420	682	430	424	376	450	372	476	398	607	439	524	414	636	480	665	484	626	422
663	441	613	424	706	435	438	376	447	372	486	407	608	440	525	415	635	479	664	483	623	419
687	450	633	435	709	439	460	394	469	390	506	419	640	460	551	427	666	494	713	505	626	433
682	446	631	434	708	438	460	394	465	386	502	416	640	460	553	428	666	494	713	507	624	433
685	449	630	435	712	442	458	392	465	386	506	419	645	463	549	424	666	494	732	509	627	436
700	452	630	434	731	451	458	392	465	386	516	422	645	463	548	423	681	503	732	516	659	438
729	467	641	444	738	458	474	400	488	409	528	435	654	475	572	448	691	516	742	526	669	448
729	466	642	445	751	464	474	400	507	420	523	432	654	475	578	455	691	516	745	528	671	453
743	481	645	450	759	472	474	400	511	423	522	431	657	478	575	450	696	521	747	531	675	458
763	490	664	456	762	477	472	399	511	423	535	439	669	489	574	452	711	523	750	533	696	471
776	503	673	467	785	489	492	417	519	434	545	449	690	498	595	472	721	533	794	548	709	488
772	498	671	466	785	489	495	419	534	442	545	449	695	506	592	472	721	535	791	545	709	487
778	505	674	469	785	489	502	424	546	443	547	451	688	500	591	472	722	536	816	553	712	490
800	514	680	475	809	508	502	424	549	447	564	457	688	500	595	491	737	538	819	556	744	503
810	528	717	493	826	515	522	441	557	456	567	462	727	529	601	497	747	548	847	573	746	508
808	527	715	491	819	508	522	441	553	455	564	464	727	533	602	498	747	549	842	569	747	509
809	528	711	486	820	509	523	442	556	457	563	463	762	541	642	499	749	556	852	578	744	507
823	535	713	489	856	522	523	442	556	457	572	467	762	541	643	503	780	560	852	578	746	518
832	545	751	507	861	527	550	458	563	468	581	477	791	566	670	518	776	562	890	590	773	531
831	545	748	504	859	524	548	456	593	476	591	481	788	568	670	520	775	561	888	591	765	523
852	545	745	501	847	512	558	456	593	477	588	478	804	569	672	523	775	561	910	578	764	522
852	545	746	502	850	515	558	461	593	480	591	477	819	573	701	527	795	569	912	578	793	528
889	573	780	519	874	527	584	472	599	488	602	485	827	593	708	534	803	581	953	590	809	547
892	574	777	515	880	533	584	472	599	493	617	494	827	595	709	542	790	569	940	591	807	542
897	579	785	525	893	539	594	477	622	495	617	494	827	595	711	543	791	570	968	629	810	551
962	599	790	529	919	554	594	477	624	498	620	499	840	595	711	544	804	583	978	639	832	560
962	599	818	540	925	558	624	497	652	513	635	508	858	610	745	553	795	582	1016	652	836	566
959	595	814	539	921	554	632	499	652	515	641	511	849	601	745	558	791	578	1008	643	823	554
960	596	815	540	920	553	639	503	653	517	644	514	858	609	740	553	793	580	1012	647	831	562

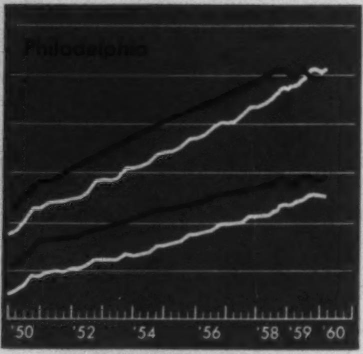
ENR Cost Indexes By Region And City

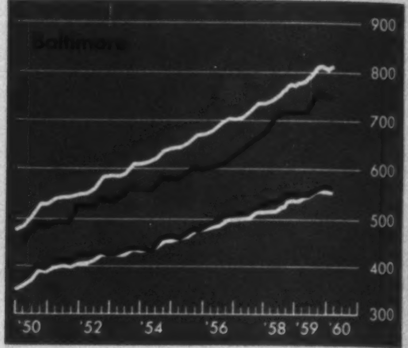




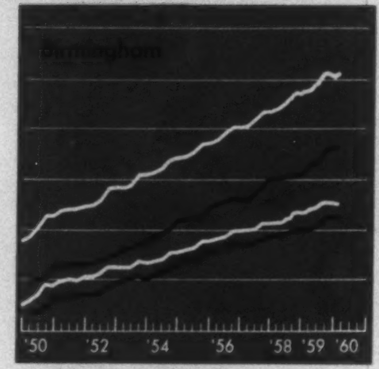


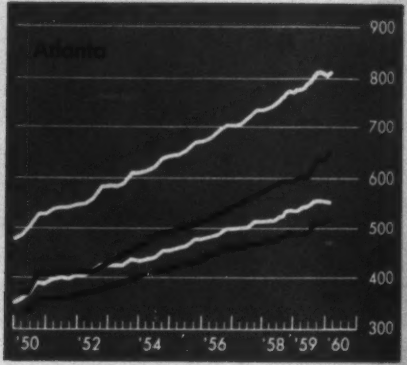


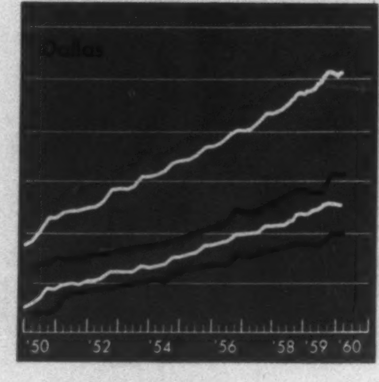


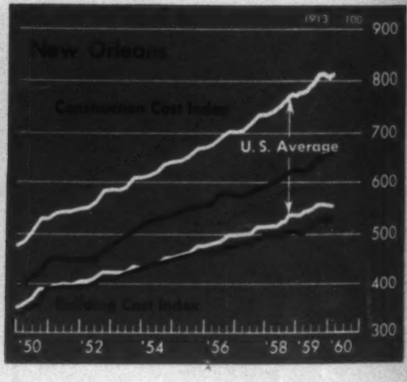


U. S. 20-CITIES AVERAGE		CANADA MONTREAL		CANADA TORONTO	
Construction	Building	Construction	Building	Construction	Building
478	357	406	314	...	...
478	356	408	316	...	...
475	353	407	315	...	...
474	349	408	316	...	...
480	352	396	316	...	...
480	353	394	314	...	...
488	360	397	317	...	...
507	373	397	317	...	...
531	393	428	346	...	...
531	391	427	345	...	...
540	399	445	363	...	...
543	401	473	378	...	...
544	400	484	385	...	...
548	406	484	385	...	...
551	407	500	383	...	...
562	413	510	393	...	...
567	424	512	395	...	...
568	425	512	395	...	...
588	425	516	399	...	...
594	426	516	399	...	...
611	436	550	430	...	...
611	435	550	430	...	...
614	437	516	396	...	...
622	440	513	393	...	...
640	454	511	393	...	...
643	457	542	422	...	...
646	460	528	408	543	444
656	465	525	405	543	449
673	479	532	412	538	436
673	479	550	427	544	432
680	483	552	429	558	446
692	489	560	437	562	450
705	500	560	437	592	465
704	500	561	438	595	459
709	501	560	437	596	462
721	504	586	451	611	469
738	516	587	452	608	468
738	516	591	453	609	471
744	516	584	446	607	470
757	521	603	449	605	468
773	535	603	449	622	460
774	535	604	449	638	479
781	540	603	449	642	483
795	548	610	450	671	500
813	556	620	457	666	497
809	553	630	459	657	488
813	555	630	459	676	498









1st Quarterly Cost Roundup

BUILDING COSTS REPORT AND OUTLOOK

What You Will Find . . .

ENR's first quarterly cost report for 1960 zeros in on buildings—and the prices, wages and competitive conditions that influence their cost.

Feature articles on office building costs, school costs and the problem of measuring man-hours on construction jobs illustrate the importance of materials and manpower in the cost picture. Money and machines, the other two M's of construction, are also covered from their cost aspect.

You will also find a brief updating of highway and other heavy construction costs and unit prices for a wide variety of projects.

But building construction cost is the principal subject of this issue.

In the three quarterly cost roundups to follow this year—June, September and December—ENR will put the emphasis on costs of highways, labor and materials of construction, in that order. Date of Highway Cost Issue: June 23.

. . . In This Report

ENR Cost Indexes, 1913-59 **opposite page**
The special foldout section at left contains ENR's Building Cost and Construction Cost indexes by city and by region.

Outlook: Wage Hikes to Upset Stability **page 82**
That's the bad news as construction moves into the 1960 round of negotiations. With the seven-month hiatus in the cost spiral about to end, profits will depend on how well contractors can control cost and increase productivity.

Record for Composite Construction ***84***
It's the biggest building of this design started so far. The savings in steel: 20 to 25%.

Contractor Prices Up—but Less than Costs ***86***
That was the '59 story. The cost rise could be slowed this year by more stable materials prices, steadier money costs and smaller wage hikes.

How Cost Trends Differ by Region ***90***
The biggest cost increases in the past 10 years have come in the South—but costs there are still lower than in the other five U. S. regions.

Industrial Equipment—A Faster Spiral ***98***
Cost of industrial equipment rose much faster in '59 than in '58, up 2.5%. But that's still a good deal less than the 5% jump in '57, and it's also less than the rise in building construction costs last year.

School Buildings for $10 a Square Foot ***100***
Here's how one school has managed to defy rising costs with four buildings that never strayed far from the $10-per-sq-ft figure.

Competition Holds School Bids Down ***102***
In New York State the '59 average was $1.67 per cu ft. That's higher than '58, but below '56 and '57. In New York City, the bid price trend is down.

More Bargain Prices Now Available ***106***
Despite increasing costs, contractors' bid prices on heavy construction were lower in '59 than in '58. Reason: More bidders on each job.

How to Measure Labor Productivity ***110***
Here's a formula to help you estimate field labor costs on plant construction and equipment erection—the biggest question mark in cost estimating.

1st Quarterly Cost Roundup

Wage Increases Wil

Building and construction costs will soon break upward as the inevitable 1960 round of wage increases emerges from construction management-labor contract negotiations. Thus ends a seven-month sidewise movement.

This means that contractors will feel a substantial cost-push in May, June, and July.

How well they control costs and offset increasing wage rates with greater productivity will determine the profitability of their 1960 operations. It could also figure importantly in how fast their new business increases this year and next, because spiraling costs are the chief threat to the construction market's growth as well as to contractor's health.

However there's evidence that contractors have done well in holding down their selling prices in the face of increased costs of manpower, labor, materials, machines and money. Building contractor selling prices in the chart at the right rose much less in '59 than costs of basic manpower and materials as measured by the ENR 20-Cities Building Cost Index. The average of four Contractor Price Indexes moved up 2.5% in 1959 compared to 4.5% for the ENR Building Cost Index, based on annual averages.

At the March 10 reading, the ENR 20-Cities Construction Cost Index hit a record 813.36, based on 1913=100. Though this is five points above December, it is less than one point above the September '59 high.

By contrast, the ENR Building Cost Index remains below it's September '59 high. But it, too, edged upward in the first quarter of '60 and is now 555.88, based on 1913=100.

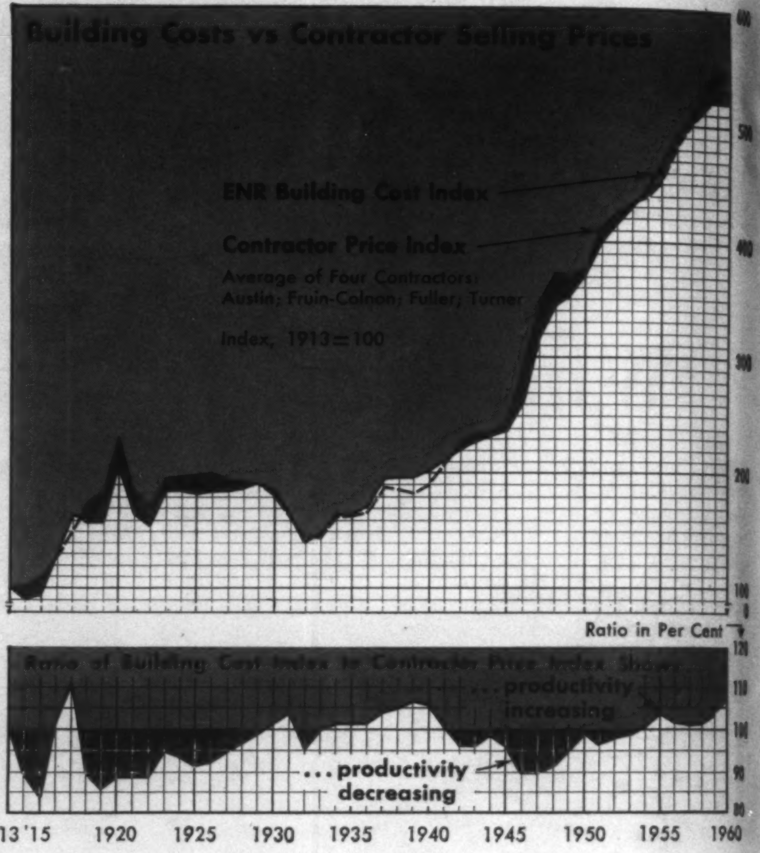
A rebound in lumber prices, cement price hikes in nine cities and scattered wage increases pushed the ENR Cost Indexes up slowly in '60. But wages alone will propel the Indexes into new high ground at a faster clip in May, June and July.

Construction management-labor bargaining sessions will be more widespread this year than last among the 20 major U. S. pricing centers included in ENR Cost Indexes.

This partly reflects the expiration of three- and two-year contracts signed in 1957 and 1958.

Wage raises to be won by common labor unions bargaining in 11 of the 20 US Cities will largely determine the 1960 increase in the Construction Cost Index, which ENR forecasts will hit 830 by December.

Skilled trades in 12 of the 20 cities will negotiate new contracts and wage increases that will raise the ENR Building Cost Index, forecast to hit 559 by December.



Deferred wage increases provided by long-term labor contracts may help set a pattern for increases to be negotiated this year. However, deferred raises range widely: For common labor in seven cities, five cents to 20 cents per hour, including fringes; bricklayers in eight cities, from 10 cents to 15 cents; carpenters in five cities, from eight cents to 22.5 cents; and structural ironworkers in six cities, from 10 cents to 22.5 cents.

Cement prices should hold steady through the end of '60, but lumber and steel remain in question. Lumber prices

How the ENR Indexes

The Construction Cost Index was established in 1921 to track the wide fluctuations in prices following World War I. It was carried back to 1913 by months and to 1903 by years.

The Building Cost Index was established in 1938 when common labor wages rose faster than skilled. It uses skilled labor only. The Construction Cost Index uses common labor only.

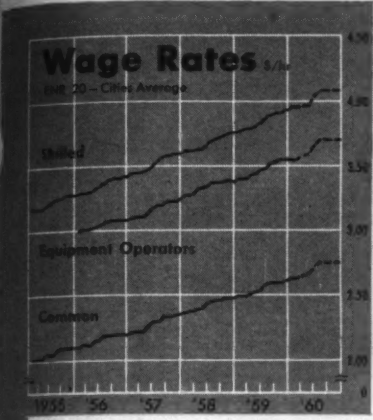
Both Indexes reprice structural steel, lumber and cement and four construction trades, common labor, bricklayers, carpenters, and structural ironworkers.

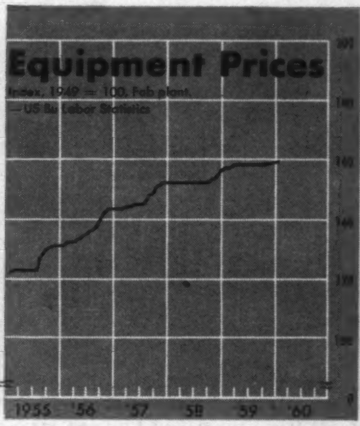
The weighing of these components is:

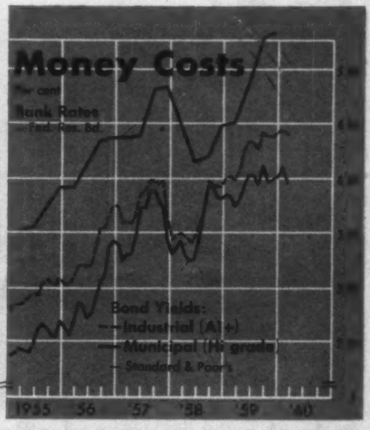
Components	Construction Cost	Building Cost
Structural Steel...cwt	25	25
Lumber, 2X4's....mbf	1,088	1.088
Cement ....bbl	6	6
Common Labor.....hr	200	0
Skilled Labor.......hr	0	68.38

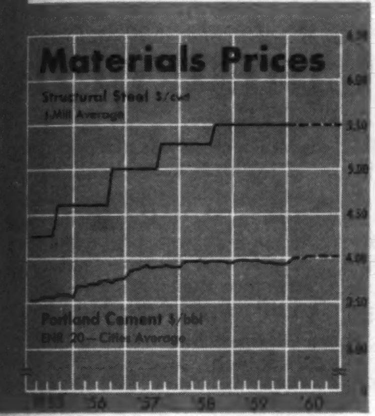
These indexes measure trends of basic materials and labor costs without correction up or down for low or high productivity of management and labor on the job. In times of low productivity, contractors' selling prices tend to rise faster than the index; when productivity is higher they drop below the index

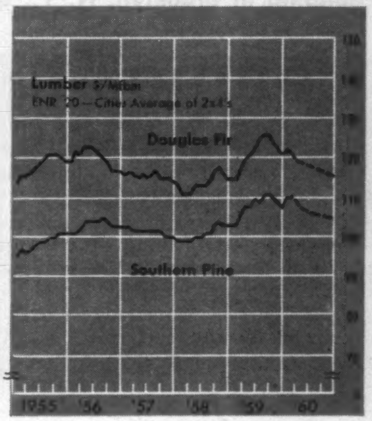
Upset Cost Stability Soon

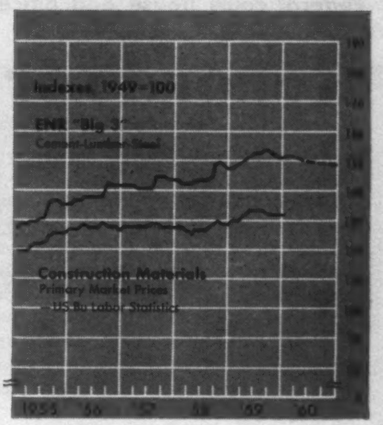












have risen counter to ENR's expectations of a downtrend. But because demand is slowing in relation to mill stocks, prices should not only stop rising, but may dip. Housing contracts in '60 will probably drop below '59, and cause lumber prices to soften. A lumber decline would help cushion the impact of wage increases on costs.

Mill prices of standard structurals, used in the ENR Cost Indexes, should hold steady until December, at least. Then the steelworkers receive the lion's share of their 1960 wage boost.

But signs point increasingly to no 1960 price hike. This month, steel warehouses or service centers in 12 of the 20 cities cut base prices on standard structural shapes greatest in demand. Prices of slow moving structurals also are cut in nine cities, raised in only three.

Construction equipment prices were upped last month or early this month on a few lines. Though no general rise seems likely this year, contractors should keep a sharp lookout.

Are Used . . .

trend. In periods of less extreme changes in productivity, these indexes have a long history of accuracy in predicting degree as well as direction of change in selling prices.

ENR's indexes are used widely to update cost estimates, to establish reproduction costs of structures, to extrapolate less frequent special purposes indexes and to check bids or estimates.

Materials prices and wage rates are repriced weekly for the Indexes. New values are published in the Scoreboard page of ENR. Weekly indexes dated closest to the first day of each month are the official monthly indexes.

Both indexes in 20 U. S. and two Canadian cities are published weekly in CONSTRUCTION DAILY. They are charted and tabulated on the insert chart opposite page 81 of this issue. Official monthly values are updated on ENR's Scoreboard page.

ENR 20-Cities Cost Indexes can be converted from the 1913 = 100 base to any other base year from 1913 to date. This table shows conversion factors for commonly used base years:

. . . and How to Convert Them

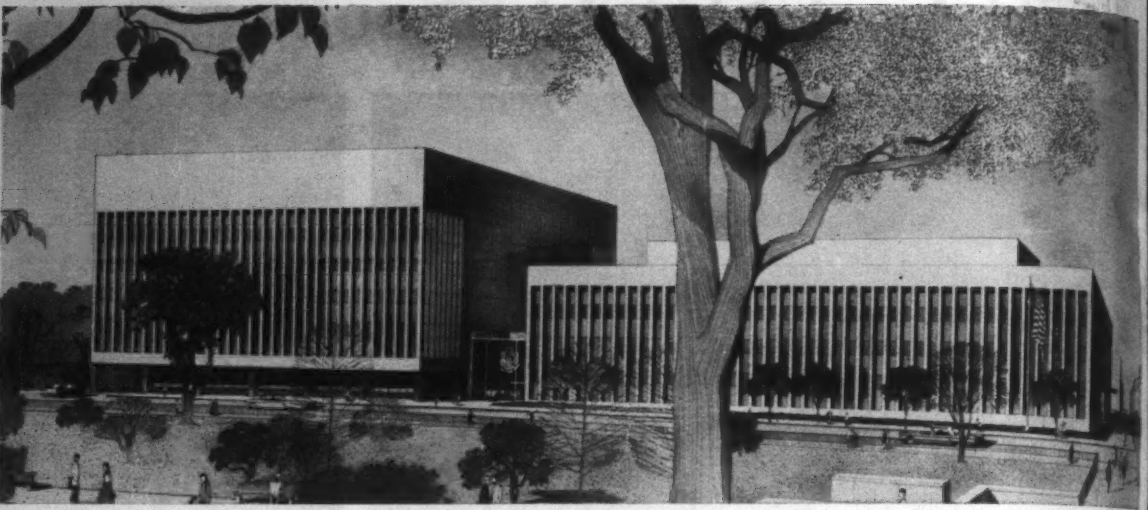
To convert from 1913=100 base to base year below . . .	Divide 1913=100 values of Construction Cost Index by . . .	Building Cost Index by . . .
1949=100	4.7702	3.5179
1947–49=100	4.5033	3.3642
1940=100	2.4196	2.0281
1939=100	2.3551	1.9744
1926=100	2.0803	1.8496
1925–29=100	2.0695	1.8657
1926–29=100	2.0702	1.8747
1929=100	2.0702	1.9086
1910–14=100	0.9380	. . . . . .
1924=100	2.1536	1.8578
1923–25=100	2.1205	1.8481
1914=100	0.8856	0.9191
1911=100	0.9343	. . . . . .

Conversions to other base years are made by simple ratios:

$$I_{nb} = \frac{I_{ob}}{I_{oby}} \times 100$$

where I_{nb} is index on new base, I_{ob} is index value on old base, I_{oby} is old base index value for new base year

* Applies to 20-cities index, not to individual cities



Federal court house and office building in Brooklyn, N. Y., sets . . .

Record for Composite Construction

By Ira Hooper and John G. Hotchkiss

Composite design—steel framing and concrete floors combined structurally—will cut 20% to 25% from steel tonnage otherwise needed for a building project in Brooklyn, N. Y. It will be the largest building of composite construction ever built. The $16-million project includes a seven-story court house and four-story federal office building joined together.

A laboratory building for Chas. Pfizer Co., Inc., at Groton, Conn., has been reported as the largest composite-designed building completed (ENR Aug. 20, 1959, p. 44). But the Brooklyn federal building will be much larger.

• Cost comparison—Selection of composite-designed structural steel beams and girders, working in conjunction with concrete floor slabs, was made for the new building by the consulting engineer after analyzing typical panels for five different floor-framing schemes.

Panels 25.5 x 25 ft were selected for a cost comparison. This panel size was the least advantageous for composite design, economic studies of larger panels showed.

The tabulation of per-square-foot costs and weights shows that schemes A_2, C and D were competitive on a cost basis. However, final selection of scheme A_2 was justified by a comparison of the total weights (dead plus live loads) of each panel, and by smaller columns and footings.

Scheme A_2 for the office building requires a spread footing 9 ft 6 in. square, 29 in. thick, with 13 No. 8 reinforcing bars each way. Scheme D, which appears to have the lowest cost per square foot for a concrete design, requires a column footing 11 ft square, 32 in. thick, with 10 No. 11 bars each way.

• Design criteria—Certain design assumptions and criteria were made for the composite-design structural steel.

All beams and girders were limited in deflection to minimize the effect of creep in the concrete. The following deflection limitations, including creep, were established:

1/360 span—D.L. plus L.L.—max. deflection for any beam.

1/480 span—D.L. plus L.L.—deflection when carrying interior masonry partitions.

1/720 span—D.L. plus L.L.—deflection when carrying exterior stone facing.

Live loads were established by directive from the General Services Administration, the federal agency for which the project will be built. These are: 30 psf—roof; 80 psf—court rooms; 100 psf—office floors; 20 psf—allowance for partitions in offices; 150 psf—mechanical equipment rooms, driveways and garages, or a concentrated wheel load where vehicles are involved.

Composite design was based on the combined effect of dead and live loads, on the assumption that during construction shoring will be used at the midspan of beams and girders. It will be removed 14 days after the concrete floor slab has been cast. All spans are treated as simply supported.

The concrete slabs are assumed to work compositely with the steel beams and girders through shear connectors automatically welded in one or two rows to the top flanges. The connectors are $\frac{3}{4}$-in.-dia x 4-in.-long studs with upset heads. Each stud is designed for a

How Composite Design Compares (For a 25.5 x 25-ft panel)

Scheme	Description	Comparative* Cost per sq ft	Total Weight* D.L. plus L.L.
A_1	Concrete slab, 12.5-ft span, composite beams & girders, steel columns, fireproofed	$2.96	205 psf
A_2	Concrete slab, 8.3-ft span, composite beams & girders, steel columns, fireproofed	$2.55	191 psf
B	Lightweight arches, steel beams, girders & columns	$3.33	202 psf
C	Reinforced concrete joists (metal pan) concrete beams, girders & columns	$2.60	227 psf
D	Two way reinforced concrete slab (waffle system) with concrete columns	$2.58	241 psf

** The costs and weights of floor schemes excluded the costs of the columns and footings. If they were considered here the economy differences would have been even more noticeable between schemes A_2, C and D.*

***Mr. Hooper** was the associate in charge of design of this building for the structural engineering consultants, Seelye, Stevenson, Value & Knecht of New York City. **Mr. Hotchkiss** is District Engineer in the New York metropolitan area for the American Institute of Steel Construction.*

4,200-lb load. The lower flange of each beam is reinforced with a welded cover plate.

The engineer developed tables for selecting the lightest wide-flange section for a given depth and reasonable-size cover plate.

• Conventional long girders—In the four-floor framing of the court house, three 60-ft girders are required over a ceremonial court room. Each girder picks up two columns with a total load of about 500 kips. These girders were designed as conventional welded plate girders.

The court house and the office building will be connected together at grade with a high-ceiling entrance and lobby, three stories high.

The court house will extend seven stories above grade and two stories below grade. It will occupy an area 153 x 232 ft. The central core, on most floors above the first, will contain the larger court rooms, including the ceremonial court room. In those rooms, floor-to-ceiling height will be 19 ft 6 in. Corridors will have a floor-to-ceiling height of 8 ft.

Outside the court rooms there are to be numerous smaller jury rooms, files, rooms for the press, judges' chambers, cell blocks, etc.—all with a floor-to-ceiling height of 9 ft. Garage accommodations will occupy most of the two floors below grade.

The federal office building will have two floors below grade and four floors above. Floor-to-floor heights vary from 12 ft 9 in. to 14 ft, a typical floor-to-ceiling height being 9 ft. This structure will be 218 x 191 ft in plan.

The entire project will be air conditioned. Horizontal ducts for the air conditioning are incorporated in the floor assembly below the beams and girders (in most cases) and above a plastered ceiling. This ceiling is continuous, has no beam-drops.

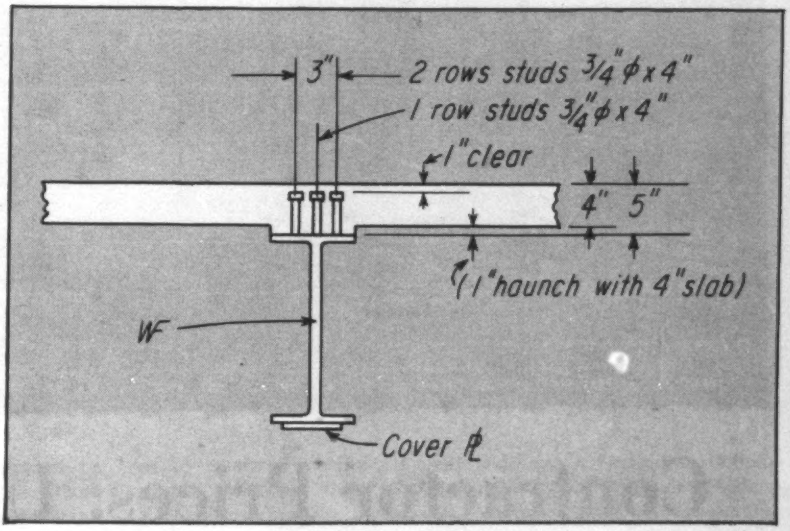
It is not of fire-retardant construction. But the floor assembly is designed to resist fire exposure; it conforms to the code of the National Board of Fire Underwriters for Type B construction. All composite beams are individually sprayed with fire-rated gypsum plaster or mineral fiber, either directly on the steel or on metal lath and plaster.

All beams and girders are composite-design, except the 60-ft girders, exterior spandrels and framing around openings, where the steel is fire protected with stone concrete. Exterior columns are encased in stone concrete, whereas interior columns are fire protected with terra cotta tile.

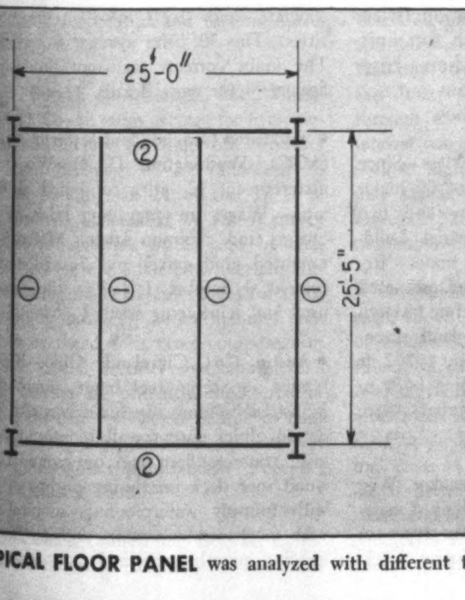
Thermal expansion between the court house and the office building is taken care of by an expansion joint. It is located at the juncture of the connecting lobby and the office building. At the lobby-roof joint, ends of lobby-roof beams are supported by 8 x ⅜-in. stainless-steel strap hangers suspended from the spandrel beams of the office building.

The architectural design was by Carson & Lundin and Lorimer Rich & Associates. The structural engineers were Seelye, Stevenson, Value & Knecht. V. L. Falotico & Associates and Joseph R. Loring & Associates were consulting electrical and mechanical engineers. All are New York City firms.

The general contract for the Court House and Federal Office Building has been awarded to a joint venture of P. J. Carlin Construction Co. and Atlas Tile & Marble Works, Long Island City, N. Y. They tendered a base bid of $13,647,000, plus $5,000 for movable metal partitions, in lieu of drywall partitions, and $135,000 for crystalline limestone, instead of oolitic limestone.



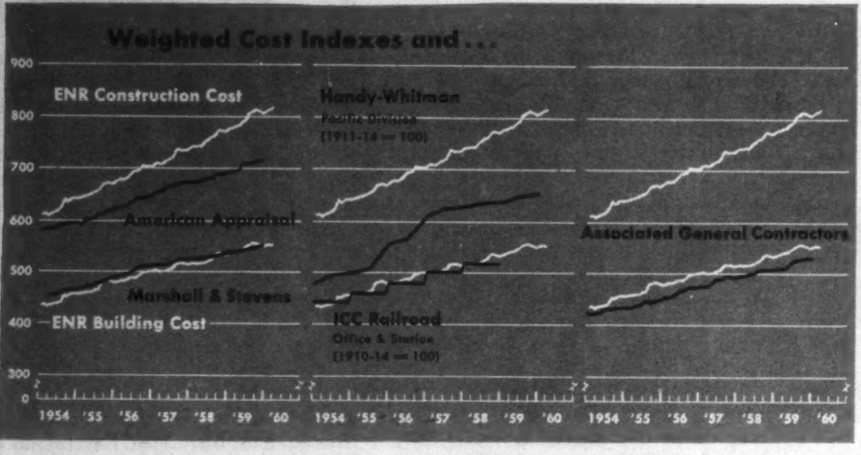
TYPICAL FLOORBEAM has cover plate on bottom flange, stud shear connectors on top.

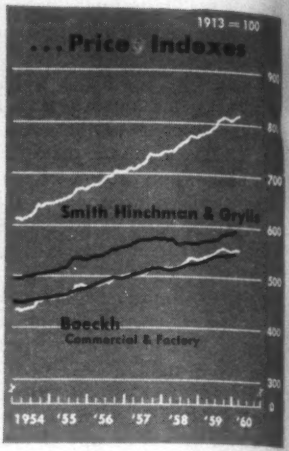


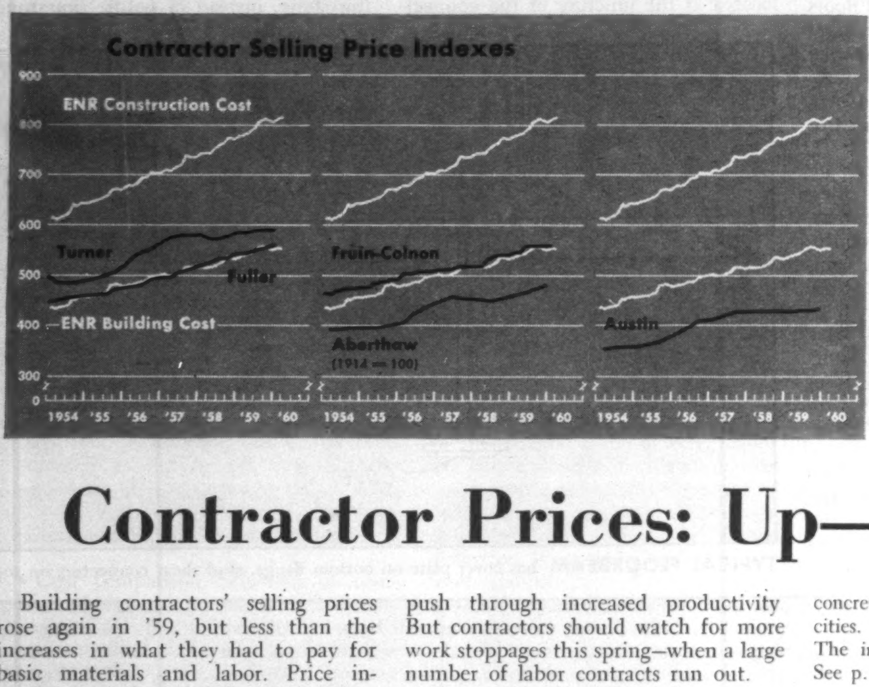
MK	Scheme A_2	Scheme B
①	12 WF 27 Bottom cover PL 4"x⅜"x13'-0" 48 ¾"φ studs	18 WF 50
②	16 WF 40 Bottom cover PL 6"x1"x18'-0" 95 ¾"φ studs	27 WF 94
Steel wt. per panel	3,628# + 239 studs	5,540#

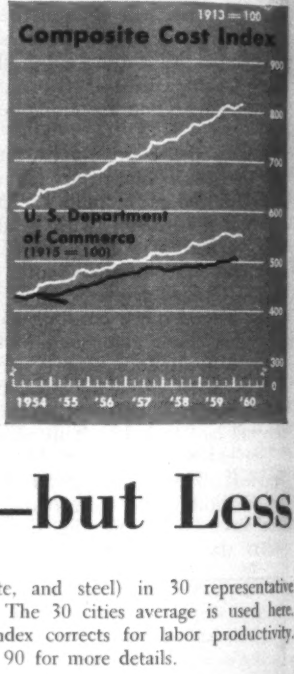
TYPICAL FLOOR PANEL was analyzed with different types of framing. Composite steel-concrete framing had the least weight.

Building Cost and Price Indexes









Contractor Prices: Up—but Less

Building contractors' selling prices rose again in '59, but less than the increases in what they had to pay for basic materials and labor. Price increases range from 0.6% to 4.4% over '58, but four of the five indexes shown held increases below the 4.4% rise in ENR's Building Cost Index.

Though the 1958-59 increases in building cost and price indexes tended to exceed those in 1957-58, there are several factors that will brake the uptrend during the rest of this year: more stable materials prices; scattered equipment price increases, and steadier money costs. Moreover, the 1960 round of wage increases may average less than last year.

Ready availability of materials, manpower and machines and the disappearance of price premiums give building contractors a better opportunity this year than last to absorb part of the cost push through increased productivity But contractors should watch for more work stoppages this spring—when a large number of labor contracts run out.

Here's what the indexes show:

- **Aberthaw Co., Boston, Mass.**—Since March 31, 1946, a composite of 36 major cost items in three multi-story and two one-story New England industrial buildings, including all mechanical trades. Repriced quarterly using actual and estimated labor and material costs. Before March 31, 1946, based on New England seven-story and basement, 62 ft 4 in. x 202 ft 4 in., reinforced concrete building built in 1914. Quarterly through December, 1956; semi-annual beginning 1957.

- **American Appraisal Co., Milwaukee, Wis.**—Index is based on detailed analysis of materials and labor required for four types of industrial building structures (frame, brick, concrete, and steel) in 30 representative cities. The 30 cities average is used here. The index corrects for labor productivity. See p. 90 for more details.

- **Associated General Contractors of America (AGC), Washington, D. C.**—Wages and materials for 12 cities combined in 40-60 ratio. Wages are prevailing rates for hod carriers and common labor. Materials are weighted: sand, gravel, and crushed stone, 1; cement, 1; lumber, 1; hollow tile, ½; structural and reinforcing steel, ½. Monthly.

- **Austin Co., Cleveland, Ohio.**—Reprices typical one-story, steel frame, monitor-type industrial building. Includes concrete foundations, brick curtain walls, continuous steel sash, concrete floor laid on ground, 2 in. wood roof deck on timber purlins covered with four-ply waterproofing, monitor sash with mechanical operators, but no heating, lighting, plumbing, sprinkler, or other serv-

These 16 indexes show . . .

Cost Trends by Type—1913=100

	Weighted Cost Indexes										Contractor Price Indexes					
	General Construction		Industrial		Comm'l & Factory	Office & Station	Utility Rein. Concrete	Hanger	General Building		Industrial			General Building		Composite Cost Index
Yr. & Month	ENR Constr. Cost	Assoc. Gen. Contr.	American Appraisal Co.	Marshall & Stevens	E. H. Boeckh *cd*	ICC Railroad	(Pacific (Division) Handy-Whitman *i*	Port of New York Authority *k*	ENR Bldg. Cost	Smith Hinchman & Grylls *ag*	Aberthaw *be*	Austin *g*	Fruin. Colnon	Fuller	Turner *h*	U.S. Dept. Commerce *d*
[illegible].....	100	100	100	100	100	...	...	...	100	...	...	100	100	100	100	...
[illegible].....	208	197	217	185	181	184	191	...	185	185	197	185	218	202	195	179
[illegible].....	157	171	155	130	144	141	145	...	141	128	168	117	178	157	136	140
[illegible].....	236	188	200	183	191	166	192	100	197	199	190	152	208	195	182	180
[illegible].....	308	231	271	248	252	244	248	109	239	285	236	234	247	241	258	235
[illegible].....	346	257	322	288	275	291	251	121	262	319	279	273	285	290	318	269
[illegible].....	413	296	430	338	323	333	328	132	313	371	304	301	347	354	382	329
[illegible].....	461	332	490	368	365	364	374	150	345	405	321	317	382	380	424	366
[illegible].....	477	342	490	365	369	368	416	155	352	395	312	307	382	382	413	363
[illegible].....	510	357	500	390	368	390	420	166	375	426	321	313	398	377	427	375
[illegible].....	543	377	532	430	415	412	458	179	401	476	370	337	433	405	478	406
[illegible].....	569	388	553	436	430	426	466	184	416	499	381	342	449	416	493	419
[illegible].....	600	408	577	448	445	438	477	194	431	504	388	347	460	429	500	429
[illegible].....	628	426	592	459	450	442	501	206	446	500	394	352	469	450	489	428
[illegible].....	660	439	608	479	465	460	524	214	469	522	398	366	483	462	498	440
[illegible].....	692	462	635	503	489	480	588	231	491	544	427	400	503	482	544	465
[illegible].....	724	483	663	515	507	500	634	245	509	568	453	420	512	504	576	482
[illegible].....	759	499	682	528	517	515	650	255	525	565	453	427	530	526	576	486
[illegible].....	**797**	**517**	**704**	**544**	**535**	...	**672**	**265**	**548**	**575**	**473**	**429**	**551**	**545**	**587**	**496**
Jan....	778	505	693	...	527	...	660	...	536	566	...	...	540	540	584	489
Feb...	779	506	693	...	527	...	...	...	537	568	...	...	541	...	...	493
Mar...	781	507	694	538	527	...	...	...	540	570	...	427	542	...	...	493
Apr....	784	509	696	...	531	...	...	...	543	570	...	...	542	540	584	493
May...	790	511	703	...	534	...	...	...	544	572	...	...	556	...	...	493
Jun...	795	516	705	544	538	...	...	...	548	574	466	429	556	...	...	496
Jul....	807	522	707	...	539	...	683	...	552	574	...	...	556	549	589	500
Aug...	811	522	709	...	539	...	...	...	554	579	...	...	556	...	...	500
Sep...	813	525	709	547	540	...	...	...	556	583	...	429	556	...	...	500
Oct....	811	526	712	...	540	...	...	...	555	583	...	...	556	549	589	500
Nov...	810	526	713	...	540	...	...	...	554	585	...	...	556	...	...	504
Dec...	809	526	714	552	542	...	...	...	553	586	479	431	556	...	...	507
[illegible]																
Jan....	812	527	...	...	542	...	679	268	554	586	...	...	556	556	589	504
Feb...	813	527	...	...	545	...	...	...	555	590	...	...	556	...	...	...
Mar...	813	...	...	...	...	...	...	...	555	...	...	...	...	...	...	...

Incl adjustment for estimated changes in productivity •b 1914 = 100 •c Incl con- •e Semi-annual since Sep. '56; •f Computed on 1926-29 base •g Computed on 1928
overhead, profit and adjustment for estimated changes in productivity •d 1915=100 base •h Computed on 1939 base •i 1911-14 = 100 •j 1910-14 = 100 •k 1939 = 100

than Costs

ices. Priced for central and eastern states. Quarterly.

• **E. H. Boeckh & Associates, Inc., Washington, D. C.**—20 cities average for five commercial and factory buildings price indexes used here. See page 92 for values for 10 classes of buildings in 21 of the 47 U. S. cities covered. Calculated by actual survey at source of materials prices paid by contractors and current labor rates (certain corrections being made in some areas for labor efficiency or shortage). Index includes construction overhead, sales taxes, compensation insurance, social security and contractor's profit. Indexes are primarily engineered to use as local cost conversion factors to construction cost data released by Boeckh. Complete formula is published in "Boeckh's Index Calculator Table."

• **Fruin-Colnon Contracting Co., St. Louis, Mo.**—Five industrial buildings in St. Louis re-priced on basis of contractor's actual and estimated material and labor costs. Monthly.

• **George A. Fuller Co., New York, N. Y.**—Based on price movements of all materials and labor needed to construct four typical buildings: two in commerce, one in industry, and one purely monumental, modified through the years to include all modern innovations of engineering and architecture, such as high-speed elevators, modern lighting, cantilever constructions, lightweight aggregates, etc. Re-priced quarterly on basis of company's experience.

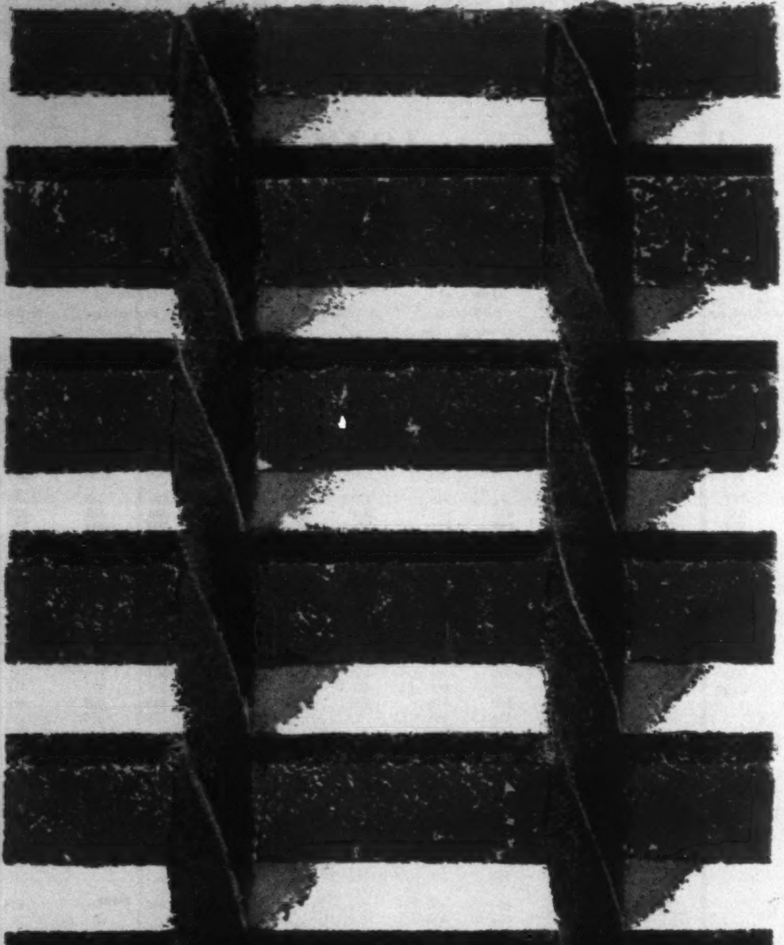
• **Marshall and Stevens, Inc. of Illinois, Chicago, Ill.**—A national average with a system of modifiers to get regional and municipal values for each of four types of buildings; A—Fireproof, protected steel; B—Fireproof, reinforced concrete; C-Masonry buildings; D—Frame. They are designed to reflect normal costs in line with recognized or published prices of building materials, equipment, and labor. Extraordinary or intangible conditions are not included. Quarterly and annual for ENR.

• **Smith Hinchman & Grylls, Inc. Detroit, Mich.**—Actual in-place costs, using building materials costs, freight rates, skilled and unskilled labor rates and including labor efficiency and premiums, bidding competition, contractors profit margins and overhead. Figured with the contractor overhead are taxes, duration of projects, material expediting, and labor procurement. Monthly.

• **Turner Construction Co., New York, N. Y.**—Eastern cities. Own cost experience on labor rates, material prices, productivity of labor, efficiency of plant and management, competitive conditions, forecast of price trends. Quarterly and special as needed.

• **Handy-Whitman, Whitman, Requardt & Associates, Inc., Baltimore.**—Reinforced concrete building in the Pacific Division series used here. See page 91 for definition and values for seven cost elements. Semi-annual.

• **Railroad Construction Cost Indexes ICC, Washington, D. C.**—Stations and office building series used here. See page 91 for definition of this Interstate Commerce Commission analysis of major contracts. Annual.



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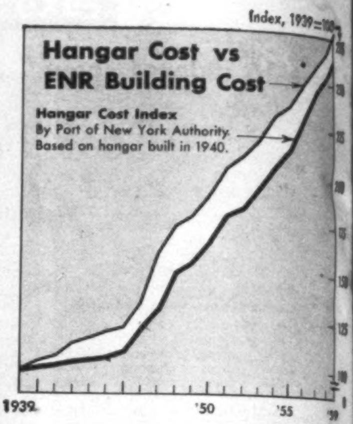

• Port of New York Authority—Hangar Cost Index is based on a hangar built in New York City in 1940. It includes 13 elements representing almost 76% of the total structural and mechanical cost. It excludes interior finish, mechanical trades and electrical work. The items used, each repriced "in place" for a combined labor and materials sub-total, include excavation and fill, concrete piles, concrete foundations (forms, concrete, reinforcing), concrete floors (forms, concrete, reinforcing), metal doors and windows, masonry, structural iron and steel, roofing and sheet metal.

This index is not adjusted for design changes, longer spans or higher clearance.

• U. S. Dept. of Commerce Composite Cost Index weighs special purpose and general construction cost and price indexes by estimated dollar volume of work put in place.

On some types of work, two indexes are used, one special purpose for deflating, the other, available monthly, for interpolating for the months between the less frequent and timely values of special purpose indexes.

By classes of construction the indexes used are residential, Boeckh; industrial building, Turner & Boeckh; warehouses, office and loft buildings, Fuller & Boeckh; other private and public buildings, American Appraisal; farm dwellings, Bu of Agriculture Economics & Boeckh; farm service buildings, BAE & Amer Appr; railroad, ICCRR & ENR Construction; telephone & telegraph, ICCT&T & ENRC; electric and gas utilities, Handy-Whitman & ENRC petroleum pipeline, HW & ENRC, ICC & ENRC; all other private, aver ENRC & Assoc. General Contractors. Military and Naval, aver of Amer Appr, Bu of Public Roads, ENRC, Fuller & Boeckh, Turner & Boeckh; highway, BuPR & ENRC; sewer & water, aver AGC & ENRC; misc public service, aver HW & ENRC; conservation & development and all other, aver of AGC & ENRC.

Monthly dollar volume estimates for each type of construction are deflated by the appropriate indexes. The sum of all deflated segments is divided into the estimated total in current dollars to get the Composite Cost Index.

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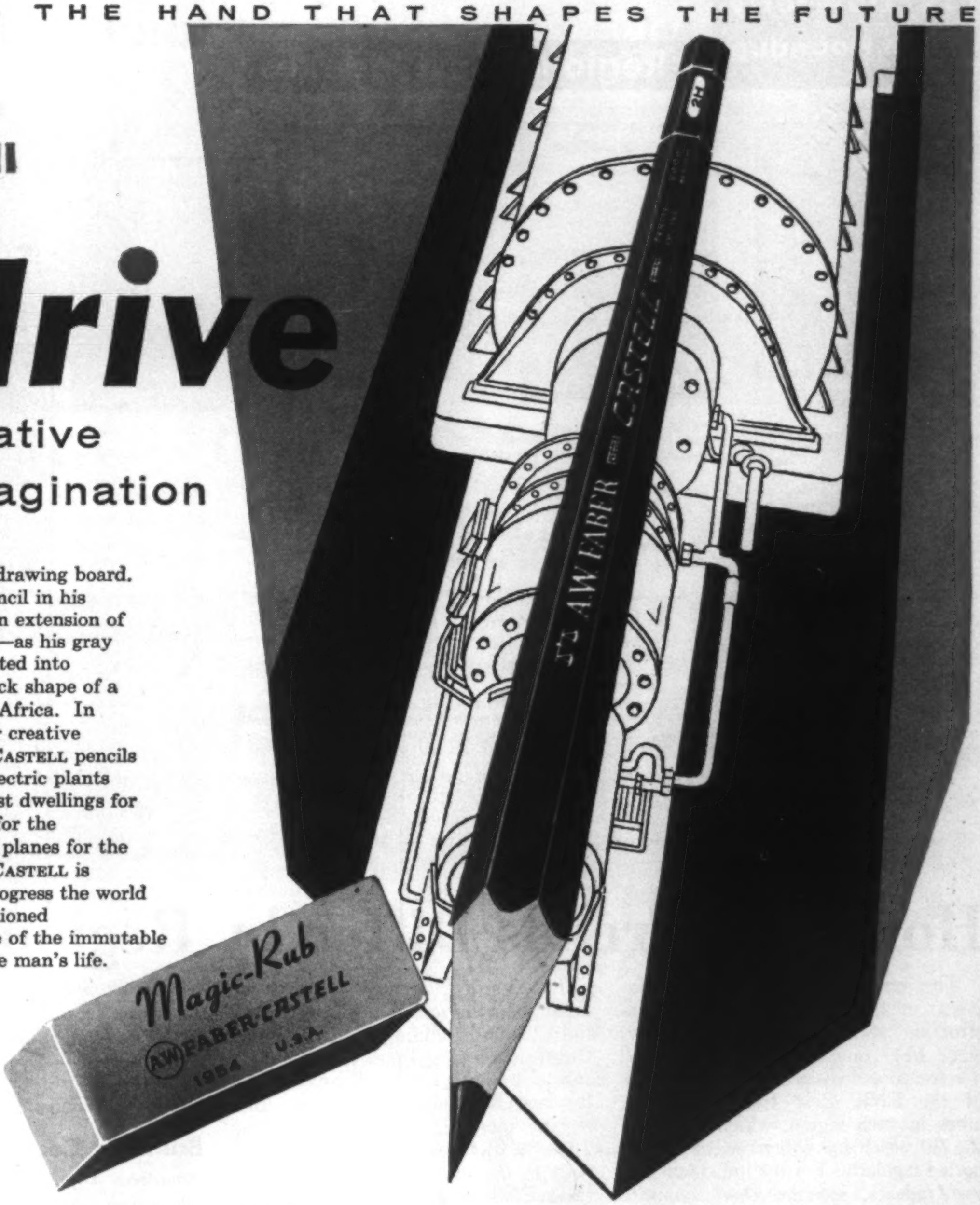

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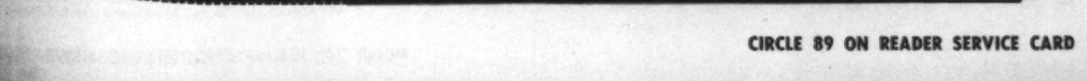
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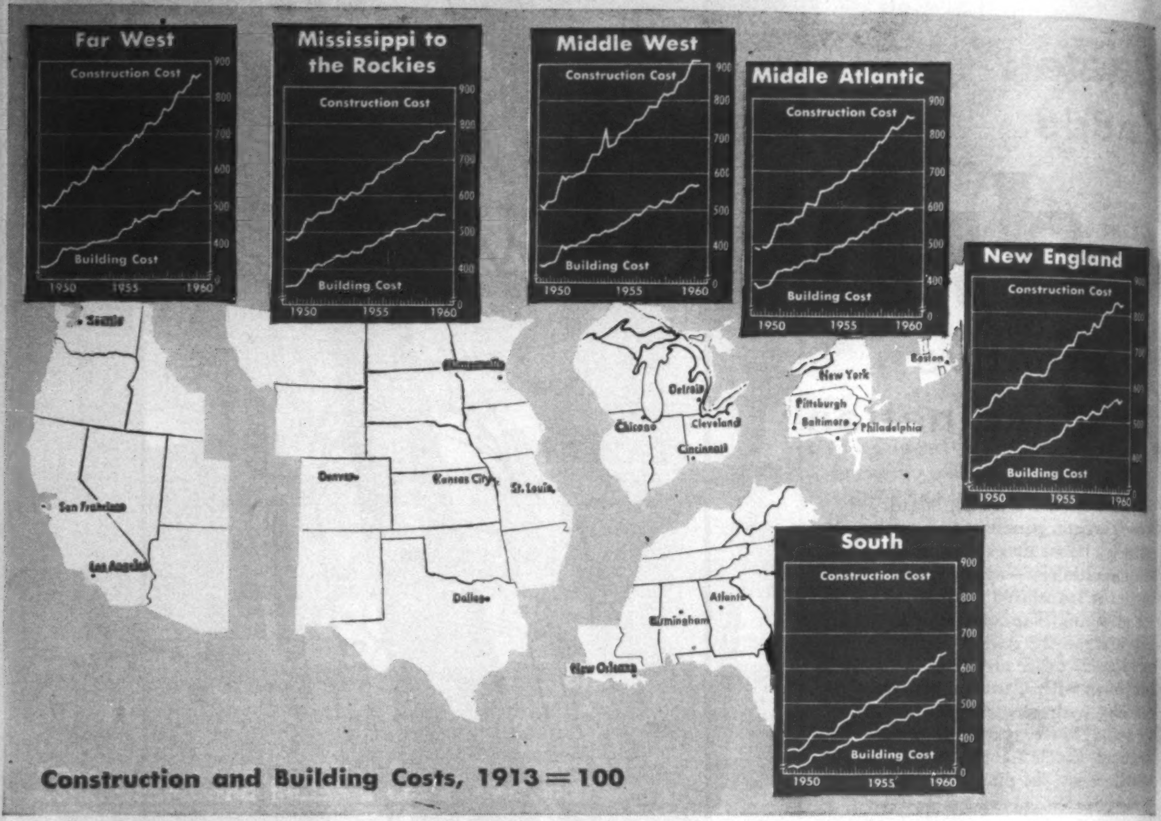
CIRCLE 89 ON READER SERVICE CARD

1st Quarterly Cost Roundup

Regional Cost Indexes



Construction and Building Costs, 1913 = 100

How Cost Trends Differ by Region

The new ENR Regional Cost Indexes in the chart above show construction and building cost increases since 1949 in each of six U. S. areas. These regional cost indexes are averages of the ENR Cost Indexes for the cities in each region, which make up the 20 cities for which prices are reported regularly. For the individual city cost indexes, see the chart opposite page 81. All are based on 1913 = 100.

The biggest cost increase for the 10 years from March '50 through March '60 is in the South, but its cost index values are still below those in other regions. The South's Construction Cost Index rose 73% in the last 10 years. This edges out 71% increases in the Middle Atlantic and Midwest and the 69% rise in the Far West. And it's much greater than the 57% gain in the Mississippi to the Rockies area, or the 51% rise in New England.

Similarly, the South's Building Cost Index rose faster than other regions during 1950-60. Its 59% increase compares with +58% in the Midwest, +55% in the Middle Atlantic and +51% to +52% in other regions.

The South continued to move up faster than the rest of the U. S. during the 12 months ending March '60. Its Construction Cost Index climbed 5.6% and its Building Cost Index rose 4.7%. By contrast, building costs in other regions increased between 2.2% and 2.7% in the past year. Construction costs in the other regions climbed between 2.8% in New England to 5.1% in the Midwest.

Cost trends for specific types of building construction—industrial, railroad, electric and gas utility, commercial and residential—by region or city are shown at right and on p. 92.

Industrial Building by City

The American Appraisal Company's cost index is based on detailed analysis of materials and labor required for four types of industrial building structure (frame, brick, concrete, and steel) in 30 representative cities. It is re-priced monthly in accordance with prevailing wage scales and labor performance for the various building trades and quotations for construction materials in 30 key cities in the United States. The index corrects for labor productivity but assumes normal average conditions and does not give any recognition to overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions.

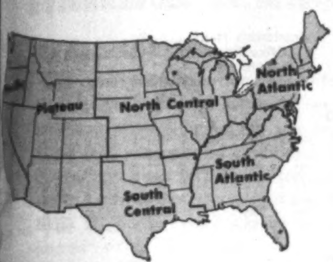
Building Cost Index

American Appraisal Co., Milwaukee, Wis., 1913 = 100

30-cities Average and 22 individual cities.

	'26	'32	'39	'42	'45	'49	'57	'58	'59	Dec '59
U. S. Aver., for 30 cities	**217**	**155**	**200**	**241**	**271**	**490**	**663**	**682**	**704**	**714**
Boston	224	169	210	248	270	485	679	706	733	734
New York	234	170	219	248	272	503	706	735	764	778
Buffalo	219	157	205	247	279	506	705	724	746	757
Baltimore	224	166	198	248	277	510	664	692	713	728
Philadelphia	225	161	196	247	275	481	659	671	684	[illegible]
Pittsburgh	236	172	219	249	279	486	648	665	689	[illegible]
Cincinnati	217	157	209	242	272	477	648	666	683	[illegible]
Cleveland	233	160	206	245	268	485	675	681	700	706
Chicago	219	162	205	235	260	452	614	626	644	654
Indianapolis	219	157	206	247	276	501	669	691	701	710
Detroit	224	148	208	252	278	500	704	724	743	756
Milwaukee	218	144	209	254	280	493	701	710	728	739
Minneapolis	197	148	202	235	266	453	635	648	669	678
Kansas City	220	156	209	239	268	469	603	622	636	645
St. Louis	230	163	208	238	265	478	653	669	683	[illegible]
Atlanta	211	147	186	240	278	514	715	742	771	779
Dallas	204	146	171	209	246	455	591	607	625	631
New Orleans	217	145	194	234	277	501	674	687	706	713
Denver	204	149	195	226	245	441	575	598	619	[illegible]
Seattle	199	141	196	244	277	509	645	654	688	[illegible]
San Francisco	188	144	183	225	244	446	614	631	655	670
Los Angeles	195	141	167	213	249	475	631	649	679	[illegible]

Handy-Whitman Public Utility Construction Cost Indexes



Individual series for 103 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually by Whitman, Requardt and Associates, Baltimore, Md. Weighting is based on experience in cost analysis of plants and building. Material prices are from ENGINEERING NEWS-RECORD, IRON AGE and various manufacturers; labor rates from BLS, unions and builders associations.

Building Construction (1911-14 = 100)

(Complete Index reports 14 Items entering into Building Construction Costs.)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '46	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	July '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., Mass., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	213	171	159	205	250	259	271	436	437	473	481	496	526	540	608	656	676	679	688	694	710	711
B	228	189	173	211	246	262	276	429	424	460	475	478	504	521	569	599	616	622	633	639	652	656
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	213	171	164	204	260	274	285	462	465	491	510	527	562	578	642	695	712	717	721	729	746	755
B	226	185	176	209	255	272	286	431	434	456	485	494	524	543	589	625	639	645	653	660	675	682
North Central Division: Ill., Ind., Iowa., Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	203	169	154	200	237	249	256	421	423	463	472	492	519	533	595	642	663	664	673	679	698	697
B	212	181	164	203	229	248	256	389	394	433	442	459	487	503	545	579	597	600	612	616	634	635
South Central Division: Ark., La., Okla., Tex.																						
A	192	149	144	188	232	242	249	411	418	445	454	471	499	508	566	617	630	634	641	647	662	663
B	203	160	154	191	223	235	244	382	387	408	426	445	466	478	520	567	578	584	594	600	613	615
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	198	153	149	194	230	238	248	402	400	435	451	471	479	499	556	610	625	627	636	637	649	652
B	211	167	163	199	221	231	257	396	396	427	443	458	465	485	520	558	573	564	549	552	585	587
Pacific Division: Calif., Ore., Wash.																						
A	191	157	148	192	238	248	251	416	420	458	466	477	501	524	588	624	644	644	655	660	683	679
B	198	164	156	193	226	241	245	386	389	419	438	448	465	488	536	561	578	581	596	601	623	625

Gas Plant Construction (1911 = 100)

(Complete Index reports 25 Items entering into Gas Plant Construction Costs.)
A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '46	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	July '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	230	202	188	241	272	283	302	475	467	514	527	540	577	600	648	695	717	734	745	760	776	780
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	219	178	175	227	261	278	291	464	456	492	510	525	560	581	623	678	693	714	721	737	749	753
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	217	198	178	232	249	264	272	441	437	481	491	508	545	565	602	648	672	684	694	706	719	721
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
South Central Division: Ark., La., Okla., Tex.																						
A	199	171	160	216	244	258	266	426	425	465	474	479	510	532	566	614	632	648	655	667	677	680
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	202	176	166	216	232	240	255	409	401	440	453	467	489	511	545	595	612	623	630	641	653	656
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
Pacific Division: Calif., Ore., Wash.																						
A	205	187	177	227	253	264	271	439	433	475	489	498	529	555	599	638	661	673	688	699	715	717
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844

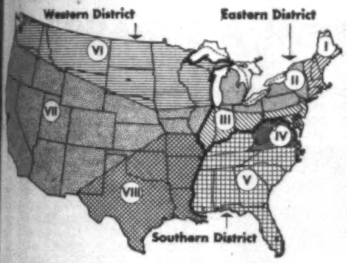
Electric Light and Power Construction (1911 = 100)

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs.)
A relates to Total Constr. & Equip. All steam; B to Accessory Electric Equipment; C to Sub-Sta. Equip.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '46	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	July '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., Mass., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	197	182	176	224	248	251	266	407	399	462	472	481	509	519	555	599	610	620	627	635	641	635
B	197	192	186	225	241	226	248	340	341	413	420	426	457	461	463	520	519	536	543	545	548	517
C	184	172	168	203	217	207	228	306	312	352	359	365	392	396	417	457	464	477	484	485	487	471
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	201	188	180	232	262	268	275	430	422	482	494	506	539	551	589	641	651	662	667	678	685	677
B	200	200	191	239	260	247	251	357	358	426	432	438	474	485	484	542	546	562	564	571	576	545
C	187	180	173	217	235	227	231	322	327	365	370	377	409	419	439	479	491	502	506	510	515	499
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	190	186	174	219	235	238	245	375	374	436	446	458	488	498	533	575	587	595	601	609	616	608
B	189	199	186	224	229	216	222	309	310	376	388	388	418	425	429	477	478	492	497	501	507	476
C	178	181	169	203	207	198	204	278	282	320	328	332	359	365	388	419	427	438	444	446	451	434
South Central Division: Ark., La., Okla., Tex.																						
A	184	179	171	218	245	248	251	391	390	448	458	468	498	508	541	591	601	611	617	623	629	621
B	187	200	190	231	250	235	235	341	340	407	416	420	454	462	461	517	517	533	539	543	547	516
C	175	181	173	210	226	217	217	310	311	344	352	356	386	394	412	450	457	470	476	478	482	466
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	190	177	171	218	234	238	244	378	376	436	447	460	484	495	527	578	594	601	604	612	623	614
B	197	194	188	231	237	225	225	322	323	390	401	407	435	441	435	482	494	508	509	513	526	494
C	185	175	171	209	213	207	207	289	294	332	342	348	374	378	392	422	442	451	453	455	467	450
Pacific Division: Calif., Ore., Wash.																						
A	180	172	163	216	235	242	244	383	379	440	454	461	487	499	535	578	590	600	608	617	625	618
B	178	182	170	222	231	225	225	328	323	394	409	409	436	440	446	496	495	517	520	528	537	503
C	167	164	155	203	210	208	208	298	297	342	357	358	382	385	411	444	451	469	473	480	487	478

Railroad Cost Indexes

Indexes for 1958, by Engineering Section, Bureau of Accounts, Cost Finding and Valuation, Interstate Commerce Commission, include items developed from analysis of major construction contracts over a period of years. Indexes for material accounts are based on studies of carriers' returns to Valuation Order 14, joint studies made with various subcommittees of President's Conference Committee, engineering and trade publications, contracts covering major construction projects, and information furnished by individual carriers.



Interstate Commerce Commission
1910-14 = 100

Station and Office Buildings

Region	1926	1932	1939	1945	1949	1954	1955	1956	1957	1958
U.S..	**184**	**141**	**166**	**244**	**368**	**442**	**460**	**480**	**500**	**515**
I...	183	142	167	238	361	431	449	468	488	502
II...	185	142	168	244	371	442	460	479	499	514
III..	185	142	168	241	369	447	466	486	506	521
IV..	183	136	160	248	367	438	457	477	497	512
V...	180	136	160	248	369	440	458	478	498	513
VI..	186	140	169	247	370	448	466	486	506	520
VII..	182	142	165	244	367	437	454	474	495	509
VIII.	180	142	166	248	369	441	459	480	500	514

Road Construction

Region	1926	1932	1939	1945	1949	1954	1955	1956	1957	1958
U.S..	**167**	**131**	**137**	**197**	**270**	**320**	**330**	**352**	**370**	**377**
I....	173	134	140	206	287	332	342	363	381	388
II...	168	133	141	202	283	333	344	367	386	394
III..	168	132	142	205	286	335	346	368	388	395
IV..	163	126	131	195	259	310	319	340	358	365
V...	165	129	136	195	265	317	326	348	366	373
VI..	164	129	132	190	253	309	317	337	355	360
VII.	166	131	133	188	256	308	318	340	358	364
VIII.	168	133	140	198	270	321	329	351	369	376

Indexes represent territorial index factors and are not for determining unit reproduction costs for individual roads.

Ratio of RR costs

	1930 %	Computed 1949 %	1953 %
Road construction	68.75	68.40	66.66
Equipment, work	0.66	0.56	0.54
Equipment, rolling & floating	23.03	24.47	26.38
General	7.56	6.57	6.42
Total	100.00	100.00	100.00

***Ratio is per cent of accounts included in road construction to total of all accounts, at 1910-14 prices, computed in 1953. Ratios computed in other years are in bottom table.**

Cost Indexes for 10 Types of Buildings

By E. H. Boeckh & Assoc., Inc., Washington, D. C.

U. S. Average 1926-'29 = 100

Annual Averages By Cities	Residences Frame	Residences Brick	Apartments, Hotels, Office Bldgs. Brick and Wood	Apartments, Hotels, Office Bldgs. Brick and Conc.	Apartments, Hotels, Office Bldgs. Steel	Commercial & Factory Bldgs. Frame	Commercial & Factory Bldgs. Steel	Commercial & Factory Bldgs. Brick and Wood	Commercial & Factory Bldgs. Brick and Steel	Commercial & Factory Bldgs. Brick and Conc
U. S. Average										
1926–29....	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939........	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1946........	161.8	161.9	161.7	154.0	154.8	165.6	145.0	158.7	154.8	156.0
1949........	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1958........	274.9	284.5	283.9	294.9	286.4	279.8	291.1	284.5	304.8	306.0
1959........	284.0	293.9	293.2	306.2	296.4	289.8	300.4	293.1	315.8	318.1
Jan. 1960...	287.5	297.6	296.5	310.5	300.6	293.6	304.0	296.3	320.0	322.7
Atlantic Area										
1926–29....	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939........	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1946........	149.2	148.1	148.2	136.8	139.9	151.7	130.0	146.8	135.1	136.4
1949........	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1958........	239.8	243.9	243.8	255.7	253.7	243.2	264.5	243.6	262.0	261.9
1959........	247.7	252.2	252.2	266.1	262.8	252.0	273.7	251.4	273.1	272.7
Jan. 1960...	252.0	256.8	256.4	272.2	267.4	256.4	278.5	255.8	278.6	279.0
Baltimore Area										
1926–29....	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939........	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1946........	163.1	161.7	162.2	149.1	150.8	167.6	138.9	158.8	150.0	148.2
1949........	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1958........	272.1	277.8	278.3	281.6	277.3	277.2	284.4	276.7	293.0	290.1
1959........	279.2	285.6	286.5	291.7	285.7	284.9	292.4	284.3	302.5	301.6
Jan. 1960...	283.9	289.7	289.8	295.6	288.9	290.3	295.1	286.9	305.8	304.2
Birmingham Area										
1926–29....	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939........	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1946........	149.3	147.4	147.9	137.3	139.4	149.7	128.1	145.4	135.2	137.4
1949........	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1958........	240.2	246.6	247.3	254.5	251.4	242.3	258.5	249.9	261.9	262.4
1959........	248.2	255.0	255.1	264.6	260.3	251.2	268.1	257.4	272.0	273.4
Jan. 1960...	251.2	257.8	258.2	268.5	264.3	254.3	272.2	260.2	276.2	277.1
Boston Area										
1926–29....	116.3	120.8	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939........	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1946........	167.0	166.5	166.0	156.8	156.6	172.1	147.1	161.1	158.5	160.4
1949........	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1958........	284.2	294.7	294.8	302.8	294.7	289.0	301.7	294.3	317.0	314.1
1959........	291.7	301.9	302.5	313.1	302.9	296.9	312.4	301.9	327.4	326.2
Jan. 1960...	296.6	306.4	306.2	318.1	308.5	301.2	317.2	305.0	332.2	330.4
Chicago Area										
1926–29....	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.0	116.0
1939........	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1946........	168.3	166.0	164.2	158.9	156.9	168.1	144.5	157.4	157.0	162.5
1949........	219.2	218.3	216.1	210.6	208.7	229.1	193.3	207.7	210.4	215.1
1958........	284.9	290.1	287.9	304.1	293.1	297.3	294.9	279.7	312.4	316.7
1959........	293.6	299.1	298.6	316.0	303.1	306.9	304.4	287.8	323.0	327.1
Jan. 1960...	297.4	304.0	301.6	319.3	307.0	310.7	308.8	292.8	329.1	334.0
Cincinnati Area										
1926–29....	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939........	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1946........	165.6	166.8	166.7	154.5	154.7	167.5	140.7	166.4	154.4	156.1
1949........	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1958........	273.8	285.9	284.7	296.3	284.9	278.4	290.8	287.9	306.8	309.5
1959........	281.0	293.7	292.3	305.8	293.6	285.8	299.4	294.8	316.4	320.5
Jan. 1960...	285.5	297.5	295.9	310.3	297.4	290.9	302.4	298.4	320.1	324.8
Cleveland Area										
1926–29....	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939........	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1946........	169.2	169.4	168.7	160.2	159.9	174.1	146.4	164.3	161.0	165.9
1949........	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1958........	294.2	306.5	304.5	316.0	301.8	302.3	301.7	305.1	327.0	331.2
1959........	303.5	315.6	313.0	325.7	310.5	313.0	310.7	312.5	337.0	341.6
Jan. 1960...	305.4	317.5	314.8	327.9	312.8	315.1	312.2	314.4	339.0	344.0
Dallas Area										
1926–29....	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939........	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1946........	150.2	148.8	149.4	139.8	144.4	153.5	140.3	144.6	142.6	141.1
1949........	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1958........	257.7	264.2	266.0	266.3	265.0	257.7	276.8	268.6	278.0	269.5
1959........	265.1	272.1	273.7	275.0	273.3	265.6	282.3	276.9	285.7	278.3
Jan. 1960...	268.4	275.3	276.7	279.3	276.8	268.4	284.6	279.8	288.8	282.7
Denver Area										
1926–29....	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939........	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1946........	160.1	160.3	150.4	155.3	157.9	164.0	155.6	156.8	160.0	158.3
1949........	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1958........	272.0	282.2	282.3	288.1	283.2	273.5	289.3	286.8	298.8	295.0
1959........	278.9	288.7	288.7	295.2	289.8	280.6	293.3	292.6	304.8	302.9
Jan. 1960...	282.1	291.7	291.9	299.2	294.3	284.1	300.6	295.5	310.4	306.5
Detroit Area										
1926–29....	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939........	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1946........	165.9	165.9	165.8	157.4	157.9	171.3	147.5	160.9	160.0	159.7
1949........	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1958........	291.0	303.2	301.7	312.2	298.5	297.5	299.9	302.9	323.2	326.6
1959........	301.4	313.9	312.2	325.6	311.0	309.7	312.8	312.6	338.0	341.4
Jan. 1960...	303.2	315.8	313.8	328.4	313.6	312.9	316.6	313.6	342.0	346.0

Annual Averages By Cities	Residences Frame	Residences Brick	Apartments, Hotels, Office Bldgs. Brick and Wood	Apartments, Hotels, Office Bldgs. Brick and Conc.	Apartments, Hotels, Office Bldgs. Steel	Commercial & Factory Bldgs. Frame	Commercial & Factory Bldgs. Steel	Commercial & Factory Bldgs. Brick and Wood	Commercial & Factory Bldgs. Brick and Steel	Commercial & Factory Bldgs. Brick and Conc.
Kansas City Area										
1926–29....	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	[illegible]
1939........	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	[illegible]
1946........	166.5	165.6	165.4	158.2	159.5	172.3	151.0	159.8	150.3	[illegible]
1949........	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	[illegible]
1958........	273.9	278.2	277.2	284.8	279.2	283.0	286.7	270.2	294.0	[illegible]
1959........	282.8	286.3	285.0	293.2	287.1	293.0	293.0	277.5	302.0	[illegible]
Jan. 1960...	285.5	289.0	287.7	295.9	289.7	295.5	294.4	280.7	304.4	[illegible]
Los Angeles Area										
1926–29....	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	[illegible]
1939........	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	[illegible]
1946........	155.1	156.1	156.2	155.3	156.7	160.1	158.3	150.9	160.0	[illegible]
1949........	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	[illegible]
1958........	286.6	277.9	276.9	302.6	294.4	276.3	310.8	272.0	316.4	[illegible]
1959........	279.1	288.7	287.2	314.9	305.1	288.1	318.9	281.3	327.6	[illegible]
Jan. 1960...	284.2	296.3	292.7	322.4	311.6	293.3	323.7	286.8	333.5	[illegible]
Minneapolis Area										
1926–29....	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939........	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1946........	163.7	167.0	167.5	156.5	155.7	164.9	142.6	168.2	157.2	150.5
1949........	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1958........	283.6	295.7	295.5	297.6	289.7	286.3	293.0	298.6	310.4	309.9
1959........	292.3	304.7	295.9	307.8	299.2	295.7	300.1	306.8	319.8	321.1
Jan. 1960...	294.7	307.5	306.9	311.4	302.4	298.3	302.4	309.1	323.0	324.7
New Orleans Area										
1926–29....	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	96.5
1939........	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1946........	148.9	147.7	148.2	138.6	142.8	151.2	138.7	145.4	142.0	138.7
1949........	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	199.6
1958........	251.1	256.7	257.4	258.5	257.9	253.5	261.0	259.1	266.7	263.4
1959........	257.8	263.6	264.1	266.9	265.7	260.8	268.4	265.4	275.1	272.9
Jan. 1960...	261.7	267.5	267.9	272.1	270.4	265.2	271.9	268.8	279.6	278.1
New York City Area										
1926–29....	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939........	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1946........	182.4	181.8	181.1	177.2	174.6	188.1	158.6	177.4	174.8	179.6
1949........	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1958........	315.1	328.0	326.0	348.6	331.3	324.5	329.3	324.0	357.3	365.4
1959........	329.0	342.7	340.1	367.7	346.7	339.3	343.1	338.3	374.1	386.9
Jan. 1960...	333.9	346.9	344.9	372.6	352.6	344.2	347.3	342.0	378.3	390.8
Philadelphia Area										
1926–29....	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939........	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1946........	165.0	163.9	164.9	153.2	154.6	169.0	141.2	161.1	152.7	154.0
1949........	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1958........	286.0	292.6	292.1	299.2	291.8	291.2	287.9	289.6	304.4	307.3
1959........	297.6	305.9	305.5	318.2	308.6	304.6	307.2	301.7	327.1	328.5
Jan. 1960...	299.1	307.2	306.8	319.2	310.9	306.5	308.5	303.1	327.8	329.9
Pittsburgh Area										
1926–29....	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.8	112.9
1939........	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1946........	169.5	169.0	168.0	156.6	155.3	173.5	140.1	166.4	153.2	158.9
1949........	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	219.8
1958........	289.7	299.4	298.1	305.5	294.0	295.5	289.8	299.5	311.8	317.6
1959........	301.8	311.5	309.7	319.5	307.0	308.4	302.0	310.4	324.7	332.8
Jan. 1960...	305.6	315.4	313.5	324.6	312.2	312.3	305.8	314.5	329.1	337.5
St. Louis Area										
1926–29....	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939........	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1946........	167.4	167.1	166.2	159.1	158.9	171.7	145.3	154.8	158.1	161.1
1949........	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1958........	287.9	297.0	295.2	304.9	293.4	295.9	295.2	293.8	313.8	318.4
1959........	296.4	305.4	303.6	315.0	301.7	305.5	304.9	301.6	323.9	329.8
Jan. 1960...	298.9	308.0	306.1	318.4	305.4	308.4	308.1	303.8	327.6	333.4
San Francisco Area										
1926–29....	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939........	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1946........	157.5	159.7	160.0	157.9	159.0	160.5	151.5	158.4	160.0	159.3
1949........	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1958........	274.9	289.8	289.0	311.5	299.5	278.9	304.3	292.9	320.8	326.7
1959........	284.4	299.2	298.0	322.7	309.3	289.1	311.5	300.9	330.1	339.1
Jan. 1960...	289.2	304.7	303.0	329.5	315.1	294.6	315.6	305.9	335.7	345.6
Seattle Area										
1926–29....	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939........	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1946........	152.9	158.3	157.9	161.2	159.8	153.3	156.0	158.9	164.2	167.1
1949........	203.9	214.3	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1958........	256.4	279.9	280.2	306.0	293.2	253.6	302.0	294.4	320.8	324.0
1959........	267.8	291.5	291.2	318.8	304.1	265.8	309.0	305.1	331.8	336.9
Jan. 1960...	271.8	296.7	296.1	326.0	310.7	269.8	314.0	309.7	338.4	346.9
Washington, D. C.										
1926–29....	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	100.4	106.4
1946........	168.5	166.2	167.1	157.1	158.2	173.6	145.2	162.6	157.2	156.6
1949........	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1958........	281.8	286.5	286.5	293.9	288.2	289.1	297.4	281.4	305.7	302.2
1959........	289.7	294.7	294.2	303.1	295.9	298.1	303.3	288.1	314.0	312.2
Jan. 1960...	294.5	299.6	[illegible]	308.9	299.9	303.1	306.0	293.5	318.2	319.0

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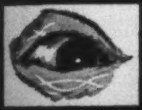

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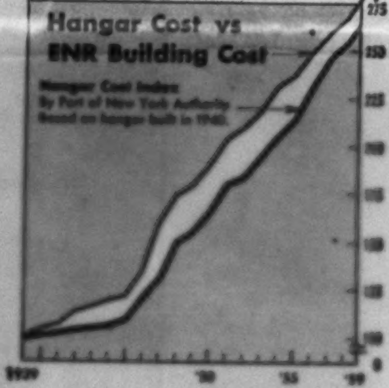

• Port of New York Authority—Hangar Cost Index is based on a hangar built in New York City in 1940. It includes 13 elements representing almost 76% of the total structural and mechanical cost. It excludes interior finish, mechanical trades and electrical work. The items used, each repriced "in place" for a combined labor and materials sub-total, include excavation and fill, concrete piles, concrete foundations (forms, concrete, reinforcing), concrete floors (forms, concrete, reinforcing), metal doors and windows, masonry, structural iron and steel, roofing and sheet metal.

This index is not adjusted for design changes, longer spans or higher clearance.

• U. S. Dept. of Commerce Composite Cost Index weighs special purpose and general construction cost and price indexes by estimated dollar volume of work put in place.

On some types of work, two indexes are used, one special purpose for deflating, the other, available monthly, for interpolating for the months between the less frequent and timely values of special purpose indexes.

By classes of construction the indexes used are residential, Boeckh; industrial building, Turner & Boeckh; warehouses, office and loft buildings, Fuller & Boeckh; other private and public buildings, American Appraisal; farm dwellings, Bu of Agriculture Economics & Boeckh; farm service buildings, BAE & Amer Appr; railroad, ICCRR & ENR Construction; telephone & telegraph, ICCT&T & ENRC; electric and gas utilities, Handy-Whitman & ENRC petroleum pipeline, HW & ENRC, ICC & ENRC; all other private, aver ENRC & Assoc. General Contractors. Military and Naval, aver of Amer Appr, Bu of Public Roads, ENRC, Fuller & Boeckh, Turner & Boeckh; highway, BuPR & ENRC; sewer & water, aver AGC & ENRC; misc public service, aver HW & ENRC; conservation & development and all other, aver of AGC & ENRC.

Monthly dollar volume estimates for each type of construction are deflated by the appropriate indexes. The sum of all deflated segments is divided into the estimated total in current dollars to get the Composite Cost Index.

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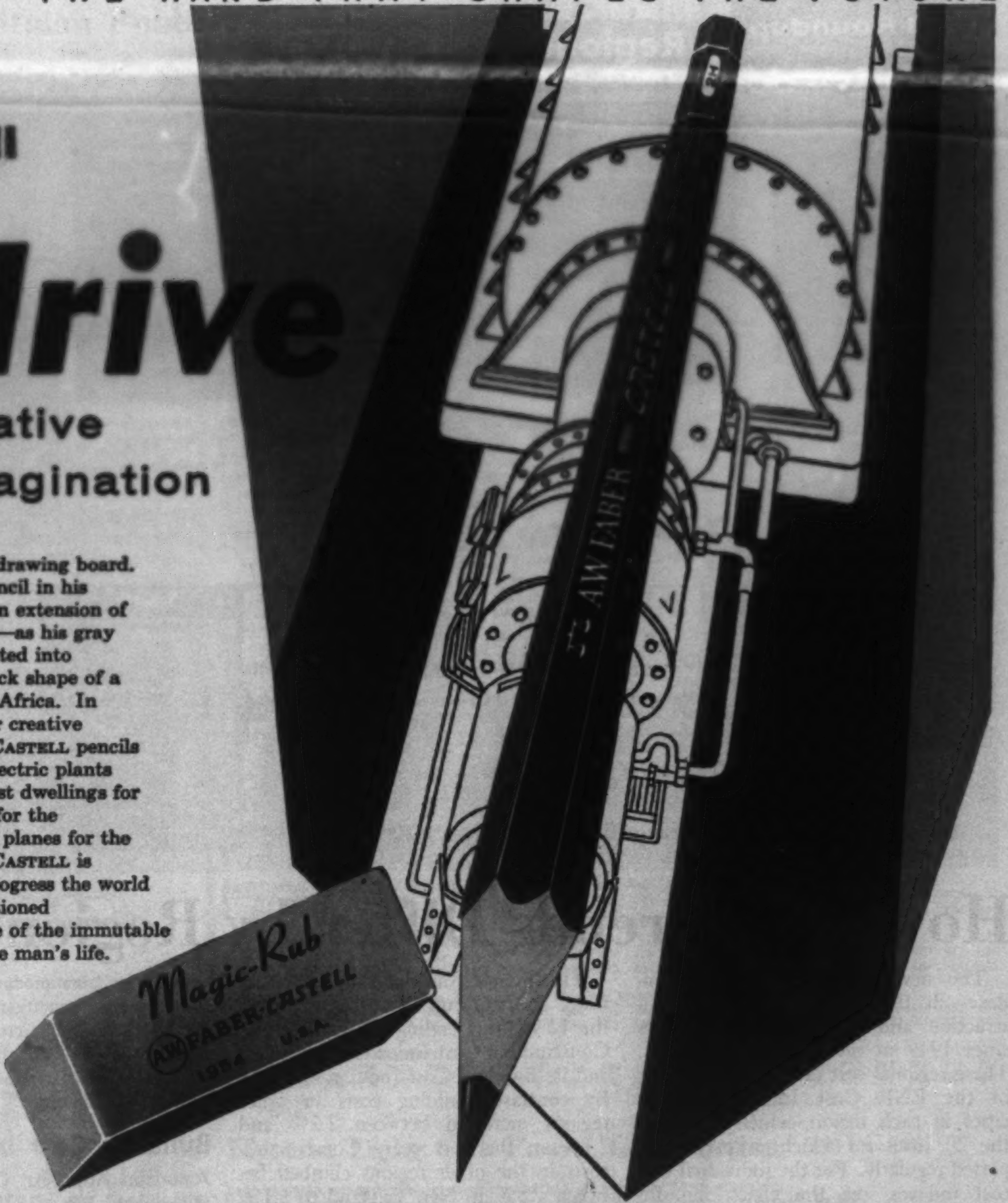

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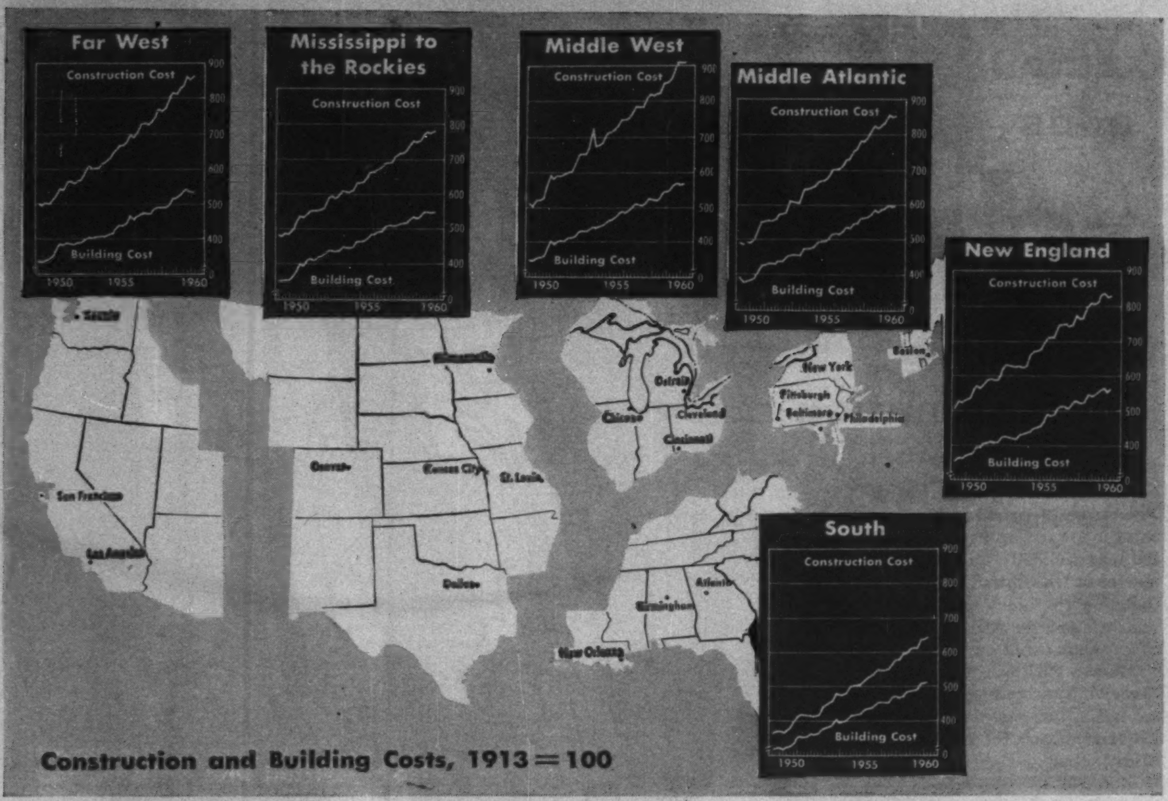
1st Quarterly Cost Roundup

Regional Cost Indexes



Construction and Building Costs, 1913 = 100

How Cost Trends Differ by Region

The new ENR Regional Cost Indexes in the chart above show construction and building cost increases since 1949 in each of six U. S. areas. These regional cost indexes are averages of the ENR Cost Indexes for the cities in each region, which make up the 20 cities for which prices are reported regularly. For the individual city cost indexes, see the chart opposite page 81. All are based on 1913 = 100.

The biggest cost increase for the 10 years from March '50 through March '60 is in the South, but its cost index values are still below those in other regions. The South's Construction Cost Index rose 73% in the last 10 years. This edges out 71% increases in the Middle Atlantic and Midwest and the 69% rise in the Far West. And it's much greater than the 57% gain in the Mississippi to the Rockies area, or the 51% rise in New England.

Similarly, the South's Building Cost Index rose faster than other regions during 1950-60. Its 59% increase compares with +58% in the Midwest, +55% in the Middle Atlantic and +51% to +52% in other regions.

The South continued to move up faster than the rest of the U. S. during the 12 months ending March '60. Its Construction Cost Index climbed 5.6% and its Building Cost Index rose 4.7%. By contrast, building costs in other regions increased between 2.2% and 2.7% in the past year. Construction costs in the other regions climbed between 2.8% in New England to 5.1% in the Midwest.

Cost trends for specific types of building construction—industrial, railroad, electric and gas utility, commercial and residential—by region or city are shown at right and on p. 92.

Industrial Building by City

The American Appraisal Company's cost index is based on detailed analysis of materials and labor required for four types of industrial building structure (frame, brick, concrete, and steel) in 30 representative cities. It is re-priced monthly in accordance with prevailing wage scales and labor performance for the various building trades and quotations for construction materials in 30 key cities in the United States. The index corrects for labor productivity but assumes normal average conditions and does not give any recognition to overtime or bonus payments to labor or premiums paid for materials in individual cases or under temporary abnormal conditions.

Building Cost Index

American Appraisal Co., Milwaukee, Wis., 1913 = 100

30-cities Average and 22 individual cities.

U. S. Aver., for 30 cities	'26	'32	'39	'42	'45	'49	'57	'58	'59	Dec '59
	217	155	200	241	271	480	663	682	704	714
Boston	224	169	210	248	270	485	679	706	733	734
New York	234	170	219	248	272	503	706	735	764	778
Buffalo	219	157	205	247	279	506	705	724	746	757
Baltimore	224	166	198	248	277	510	664	692	713	728
Philadelphia	225	161	196	247	275	481	650	671	684	694
Pittsburgh	236	172	219	249	279	486	648	665	689	698
Cincinnati	217	157	209	242	272	477	648	666	683	692
Cleveland	233	160	206	245	268	485	675	681	700	708
Chicago	219	162	205	235	260	452	614	626	644	654
Indianapolis	219	157	206	247	276	501	669	691	701	710
Detroit	224	148	208	252	278	500	704	724	743	758
Milwaukee	218	144	209	254	280	493	701	710	728	730
Minneapolis	197	148	202	235	266	453	635	648	669	678
Kansas City	220	156	209	239	268	469	603	622	636	645
St. Louis	230	163	208	238	265	478	653	660	683	690
Atlanta	211	147	186	240	278	514	715	742	771	779
Dallas	204	146	171	209	246	455	591	607	625	631
New Orleans	217	145	194	234	277	501	674	687	708	713
Denver	204	149	195	226	245	441	575	598	619	627
Seattle	190	141	196	244	277	509	645	654	688	696
San Francisco	188	144	183	225	244	446	614	631	655	670
Los Angeles	195	141	167	213	249	475	631	649	679	693

Handy-Whitman Public Utility Construction Cost Indexes

Pacific
Plateau
North Central
North Atlantic
South Atlantic
South Central

Individual series for 103 cost elements in three classes of utility construction, for six geographic divisions of the United States, are reported semi-annually by Whitman, Requardt and Associates, Baltimore, Md. Weighting is based on experience in cost analysis of plants and building. Material prices are from ENGINEERING NEWS-RECORD, IRON AGE and various manufacturers; labor rates from BLS, unions and builders associations.

Building Construction (1911-14 = 100)

(Complete Index reports 14 Items entering into Building Construction Costs.)
A relates to Reinforced Concrete Bldg.; B relates to Brick Bldg.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '46	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	July '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., Mass., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	213	171	159	205	250	259	271	436	437	473	481	496	526	540	608	656	676	679	688	694	710	711
B	228	189	173	211	246	262	276	429	424	460	475	478	504	521	569	599	616	622	633	639	652	656
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	213	171	164	204	260	274	285	462	465	491	510	527	562	578	642	695	712	717	721	729	746	755
B	226	185	176	209	255	272	286	431	434	456	485	494	524	543	589	625	639	645	653	660	675	682
North Central Division: Ill., Ind., Iowa., Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	203	169	154	200	237	249	256	421	423	463	472	492	519	533	595	642	663	664	673	679	698	697
B	212	181	164	203	229	248	256	389	394	433	442	459	487	503	545	579	597	600	612	616	634	635
South Central Division: Ark., La., Okla., Tex.																						
A	192	149	144	188	232	242	249	411	418	445	454	471	499	508	566	617	630	634	641	647	662	663
B	203	160	154	191	223	235	244	382	387	408	426	445	466	478	520	567	578	584	594	600	613	615
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	198	153	149	194	230	238	248	402	400	435	451	471	479	499	556	610	625	627	636	637	649	652
B	211	167	163	199	221	231	257	396	396	427	443	458	465	485	520	558	573	564	549	552	585	587
Pacific Division: Calif., Ore., Wash.																						
A	191	157	148	192	238	248	251	416	420	458	466	477	501	524	588	624	644	644	655	660	683	679
B	198	164	156	193	226	241	245	386	389	419	438	448	465	488	536	561	578	581	596	601	623	625

Gas Plant Construction (1911 = 100)

(Complete Index reports 25 Items entering into Gas Plant Construction Costs.)
A relates to Total Constr. & Equip.; B relates to Mech. Equip. Exclusive of Gas Holders.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '46	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	July '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	230	202	188	241	272	283	302	475	467	514	527	540	577	600	648	695	717	734	745	760	776	780
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	219	178	175	227	261	278	291	464	456	492	510	525	560	581	623	678	693	714	721	737	749	753
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	217	198	178	232	249	264	272	441	437	481	491	508	545	565	602	648	672	684	694	706	719	721
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
South Central Division: Ark., La., Okla., Tex.																						
A	199	171	160	216	244	258	266	426	425	465	474	479	510	532	566	614	632	648	655	667	677	680
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	202	176	166	216	232	240	255	409	401	440	453	467	489	511	545	595	612	623	630	641	653	656
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844
Pacific Division: Calif., Ore., Wash.																						
A	205	187	177	227	253	264	271	439	433	475	489	498	529	555	599	638	661	673	688	699	715	717
B	212	209	195	274	297	296	300	481	479	549	553	567	606	615	672	772	799	816	823	849	854	844

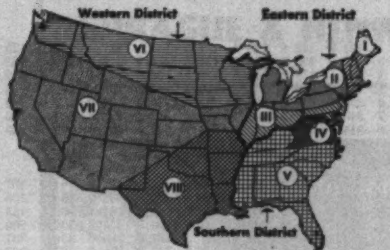
Electric Light and Power Construction (1911 = 100)

(Complete Index reports 64 Items entering into Electric Light and Power Construction Costs.)
A relates to Total Constr. & Equip. All steam; B to Accessory Electric Equipment; C to Sub-Sta. Equip.

	Jan. '26	Jan. '32	July '32	Jan. '39	Jan. '42	Jan. '45	Jan. '46	Jan. '49	Jan. '50	Jan. '51	Jan. '52	Jan. '53	Jan. '54	Jan. '55	Jan. '56	Jan. '57	July '57	Jan. '58	July '58	Jan. '59	July '59	Jan. '60
North Atlantic Division: Conn., Del., Me., Md., Mass., N. J., N. Y., Pa., R. I., Vt., W. Va.																						
A	197	182	176	224	248	251	266	407	399	462	472	481	509	519	555	599	610	630	627	635	641	635
B	197	192	186	225	241	226	248	340	341	413	420	426	457	461	463	520	519	536	543	545	548	517
C	184	172	168	203	217	207	228	306	312	352	350	365	392	396	417	457	464	477	484	485	487	471
South Atlantic Division: Ala., Fla., Ga., Ky., N. C., S. C., Tenn., Va.																						
A	201	188	180	232	262	268	275	430	422	482	494	506	539	551	589	641	651	662	667	678	685	677
B	200	200	191	239	260	247	251	357	358	426	432	438	474	485	484	542	546	562	564	571	576	545
C	187	180	173	217	235	227	231	322	327	365	370	377	409	419	439	479	491	502	506	510	515	499
North Central Division: Ill., Ind., Iowa, Kan., Mich., Minn., Mo., Neb., N. D., Ohio, S. D.																						
A	190	186	174	219	235	238	245	375	374	436	446	458	488	498	533	575	587	595	601	609	616	608
B	189	199	186	224	229	216	222	309	310	376	388	388	418	425	429	477	478	492	497	501	507	476
C	178	181	169	203	207	198	204	278	282	320	328	332	359	365	388	419	437	438	444	446	451	434
South Central Division: Ark., La., Okla., Tex.																						
A	184	179	171	218	245	248	251	391	390	448	458	468	498	508	541	591	601	611	617	623	629	621
B	187	200	190	231	250	235	235	341	340	407	416	420	454	462	461	517	517	533	539	543	547	516
C	175	181	173	210	226	217	217	310	311	344	352	356	386	394	412	450	457	470	476	478	482	466
Plateau Division: Ariz., Colo., Idaho, Mont., Nev., N. M., Utah, Wyo.																						
A	190	177	171	218	234	238	244	378	376	436	447	460	484	495	527	578	594	601	604	612	623	614
B	197	194	188	231	237	225	225	322	323	390	401	407	435	441	435	482	494	508	509	513	526	494
C	185	175	171	209	213	207	207	280	294	332	342	348	374	378	392	422	442	451	453	455	467	450
Pacific Division: Calif., Ore., Wash.																						
A	180	172	163	216	235	242	244	383	379	440	454	461	487	499	535	578	590	600	608	617	625	618
B	178	182	170	222	231	225	225	328	323	394	409	409	436	440	446	496	495	517	520	528	537	503
C	167	164	155	203	210	208	208	298	297	342	357	358	382	385	411	444	451	469	473	480	487	478

Railroad Cost Indexes

Indexes for 1958, by Engineering Section, Bureau of Accounts, Cost Finding and Valuation, Interstate Commerce Commission, include items developed from analysis of major construction contracts over a period of years. Indexes for material accounts are based on studies of carriers' returns to Valuation Order 14, joint studies made with various subcommittees of President's Conference Committee, engineering and trade publications, contracts covering major construction projects, and information furnished by individual carriers.



Interstate Commerce Commission 1910-14 = 100

Station and Office Buildings

Region	1926	1932	1939	1945	1949	1954	1955	1956	1957	1958
US..	184	141	166	244	368	442	460	480	500	515
I....	183	142	167	238	361	431	449	468	488	502
II...	185	142	168	244	371	442	460	479	499	514
III..	185	142	168	241	369	447	466	486	506	521
IV..	183	136	160	248	367	438	457	477	497	512
V...	180	136	160	248	360	440	456	476	498	513
VI..	186	140	169	247	370	448	466	486	506	520
VII..	182	142	165	244	367	437	454	474	495	509
VIII.	189	142	166	248	369	441	459	480	500	514

Road Construction

Region	1926	1932	1939	1945	1949	1954	1955	1956	1957	1958
US..	167	131	137	197	270	320	330	352	370	377
I....	173	134	140	206	287	332	342	363	381	388
II...	168	133	141	202	283	333	344	367	386	394
III..	168	132	142	205	286	335	346	368	388	395
IV..	163	126	131	195	250	310	319	340	358	365
V...	165	129	136	195	265	317	326	348	366	373
VI..	164	129	132	190	253	309	317	337	355	360
VII..	166	131	133	188	256	308	318	340	358	364
VIII.	168	133	140	198	270	321	329	351	369	376

Indexes represent territorial index factors and are not for determining unit reproduction costs for individual roads.

Ratio of RR costs

	Computed		
	1930 %	1949 %	1953 %
Road construction	68.75	68.40	66.66
Equipment, work	0.66	0.56	0.54
Equipment, rolling & floating	23.03	24.47	26.38
General	7.56	6.57	6.42
Total	100.00	100.00	100.00

* Ratio is per cent of accounts included in road construction to total of all accounts, at 1910-14 prices, computed in 1953. Ratios computed in other years are in bottom table.

Cost Indexes for 10 Types of Buildings

By E. H. Boeckh & Assoc., Inc., Washington, D. C.

U. S. Average 1926-'29=100

U. S. Average

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	101.4	102.5	102.5	102.8	101.3	102.2	100.8	101.7	102.2	104.6
1939	101.2	104.4	104.1	111.2	109.4	101.3	110.4	105.0	112.1	113.3
1946	161.8	161.9	161.7	154.0	154.8	165.6	145.0	158.7	154.8	156.0
1949	213.8	215.6	215.0	208.1	208.4	218.4	195.5	211.9	208.7	211.4
1958	274.9	284.5	283.9	294.9	286.4	279.8	291.1	284.5	304.8	306.0
1959	284.0	293.9	293.2	306.2	296.4	289.8	300.4	293.1	315.8	318.1
Jan. 1960	287.5	297.6	296.5	310.5	300.6	293.6	304.0	296.3	320.0	322.7

Atlantic Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	82.7	87.0	84.2	83.7	87.0	82.9	94.5	84.7	87.5	86.8
1939	82.8	86.0	86.1	95.1	95.0	80.6	96.2	88.6	94.6	97.4
1946	149.2	148.1	148.2	136.8	139.9	151.7	130.0	146.8	135.1	136.4
1949	189.9	189.3	189.3	180.6	185.4	191.7	172.7	186.5	177.5	180.8
1958	239.8	243.9	243.8	255.7	253.7	243.2	264.5	243.6	262.0	261.9
1959	247.7	252.2	252.2	266.1	262.8	252.0	273.7	251.4	273.1	272.7
Jan. 1960	252.0	256.8	256.4	272.2	267.4	256.4	278.5	255.8	278.6	279.0

Baltimore Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	107.2	112.0	107.6	100.6	100.7	106.3	95.5	106.8	96.8	101.2
1939	93.5	95.5	95.6	99.3	99.2	94.0	101.7	96.6	101.4	100.2
1946	163.1	161.7	162.2	149.1	150.8	167.6	138.9	158.8	150.0	148.2
1949	216.4	217.4	217.3	204.5	204.8	220.5	191.8	216.6	204.6	208.5
1958	272.1	277.8	278.3	281.6	277.3	277.2	284.4	276.7	293.0	290.1
1959	279.2	285.6	286.5	291.7	285.7	284.9	292.4	284.3	302.5	301.6
Jan. 1960	283.9	289.7	289.8	295.6	288.9	290.3	295.1	286.9	305.8	304.2

Birmingham Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	91.7	96.7	94.1	95.5	96.8	90.2	97.5	94.6	96.3	96.3
1939	87.8	90.9	91.5	96.1	96.2	84.9	96.9	95.1	95.6	96.3
1946	149.3	147.4	147.9	137.3	139.4	149.7	128.1	145.4	135.2	137.4
1949	188.2	187.2	187.6	178.9	182.0	192.8	172.6	183.7	177.7	180.0
1958	240.2	246.6	247.3	254.5	251.4	242.3	258.5	249.9	261.9	262.4
1959	248.2	255.0	255.1	264.6	260.3	251.2	268.1	257.4	272.0	273.4
Jan. 1960	251.2	257.8	258.2	268.5	264.3	254.3	272.2	260.2	276.2	277.1

Boston Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	116.3	120.8	115.4	106.2	107.0	118.8	106.3	112.5	108.7	105.8
1939	106.2	110.4	110.1	116.3	113.7	105.7	114.2	111.5	118.2	118.5
1946	167.0	166.5	166.0	156.8	156.6	172.1	147.1	161.1	158.5	160.4
1949	223.0	226.5	225.9	216.7	215.6	227.1	201.3	222.9	218.2	221.9
1958	284.2	294.7	294.8	302.8	294.7	289.0	301.7	294.3	317.0	314.1
1959	291.7	301.9	302.5	313.1	302.9	296.9	312.4	301.9	327.4	326.2
Jan. 1960	296.6	306.4	306.2	318.1	308.5	301.2	317.2	305.0	332.2	330.4

Chicago Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	109.2	114.2	109.8	113.2	109.1	112.9	105.2	105.9	112.0	116.0
1939	110.6	112.5	111.1	123.6	118.7	114.2	117.6	109.3	122.6	127.6
1946	168.3	166.0	164.2	158.9	156.9	168.1	144.5	157.4	157.0	162.5
1949	219.2	218.3	216.1	210.6	208.7	229.1	193.3	207.7	210.4	215.1
1958	284.9	290.1	287.9	304.1	293.1	297.3	294.9	279.7	312.4	316.7
1959	293.6	299.1	298.6	316.0	303.1	306.9	304.4	287.8	323.0	327.1
Jan. 1960	297.4	304.0	301.6	319.3	307.0	310.7	308.8	292.8	329.1	334.0

Cincinnati Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	100.5	105.0	101.3	101.0	100.2	100.2	99.6	103.1	100.6	101.0
1939	103.3	106.2	105.9	113.9	110.4	103.3	111.7	107.1	113.7	116.5
1946	165.6	166.8	166.7	154.5	154.7	167.5	140.7	166.4	154.4	156.1
1949	214.1	216.6	215.8	207.5	206.0	217.9	193.5	214.1	208.4	212.2
1958	273.8	285.9	284.7	296.3	284.9	278.4	290.8	287.9	306.8	309.5
1959	281.0	293.7	292.3	305.8	293.6	285.8	299.4	294.8	316.4	320.5
Jan. 1960	285.5	297.5	295.9	310.3	297.4	290.9	302.4	298.4	320.1	324.8

Cleveland Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	107.2	113.4	108.5	111.3	108.3	109.0	103.0	107.2	110.5	114.8
1939	106.2	109.6	109.5	115.3	112.8	107.5	112.9	109.5	117.7	118.0
1946	169.2	169.4	168.7	160.2	159.9	174.1	146.4	164.3	161.0	165.9
1949	224.8	225.7	223.6	216.0	213.0	233.0	198.5	218.0	217.2	220.9
1958	294.2	306.5	304.5	316.0	301.8	302.3	301.7	305.1	327.0	331.2
1959	303.5	315.6	313.0	325.7	310.5	313.0	310.7	312.5	337.0	341.6
Jan. 1960	305.4	317.5	314.8	327.9	312.8	315.1	312.2	314.4	339.0	344.0

Dallas Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	103.1	107.3	103.2	98.9	99.1	103.6	100.5	100.9	99.4	99.7
1939	95.1	95.8	96.7	98.8	100.2	94.8	106.6	96.0	101.9	98.9
1946	150.2	148.8	149.4	139.8	144.4	153.5	140.3	144.6	142.6	141.1
1949	207.2	206.2	206.9	197.1	201.3	210.3	197.1	203.2	201.5	195.4
1958	257.7	264.2	266.0	266.3	265.0	257.7	276.8	268.6	278.0	269.5
1959	265.1	272.1	273.7	275.0	273.3	265.6	282.3	276.9	285.7	278.3
Jan. 1960	268.4	275.3	276.7	279.3	276.8	268.4	284.6	279.8	288.8	282.7

Denver Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	95.0	99.7	95.5	102.4	99.6	95.5	105.5	94.6	101.4	108.0
1939	112.1	112.0	111.2	116.1	114.4	114.3	118.7	109.5	117.0	117.8
1946	160.1	160.3	150.4	155.3	157.9	164.0	155.6	156.8	160.0	158.3
1949	212.9	215.8	215.9	211.0	213.1	216.2	207.0	214.3	214.6	215.3
1958	272.0	282.2	282.3	288.1	283.2	273.5	289.3	286.8	298.8	295.0
1959	278.9	288.7	288.7	295.2	289.8	280.6	293.3	292.6	304.8	302.9
Jan. 1960	282.1	291.7	291.9	299.2	294.3	284.1	300.6	295.5	310.4	306.5

Detroit Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc
1926–29	103.3	108.4	104.3	102.9	102.4	103.7	103.1	103.5	103.3	104.4
1939	98.8	102.7	102.9	108.6	107.5	98.7	108.8	104.2	111.4	110.1
1946	165.9	165.9	165.8	157.4	157.9	171.3	147.5	160.9	160.0	159.7
1949	221.0	222.6	221.9	212.2	211.5	227.0	196.8	216.8	214.2	215.9
1958	291.0	303.2	301.7	312.2	298.5	297.5	299.9	302.9	323.2	326.6
1959	301.4	313.9	312.2	325.6	311.0	309.7	312.8	312.6	338.0	341.4
Jan. 1960	303.2	315.8	313.8	328.4	313.6	312.9	316.6	313.6	342.0	346.0

Kansas City Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	100.3	106.5	102.2	105.7	103.3	101.1	105.9	101.9	107.5	108.8
1939	104.4	109.9	109.8	118.3	115.4	103.8	117.2	113.0	120.0	121.6
1946	166.5	165.6	165.4	158.2	159.5	172.3	151.0	159.8	159.3	160.3
1949	215.9	216.7	216.3	209.0	211.1	221.8	199.4	210.0	211.3	211.5
1958	273.9	278.2	277.2	284.8	279.2	283.0	286.7	270.2	294.0	295.2
1959	282.8	286.3	285.0	293.2	287.1	293.0	293.0	277.5	302.0	303.4
Jan. 1960	285.5	289.0	287.7	295.9	289.7	295.5	294.4	280.7	304.4	306.0

Los Angeles Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	92.7	97.9	93.5	98.8	96.8	93.5	97.0	91.3	97.5	103.1
1939	93.6	97.2	97.5	103.7	105.0	95.6	109.5	96.8	106.2	104.9
1946	155.1	156.1	156.2	155.3	156.7	160.1	158.3	150.9	160.0	158.7
1949	203.2	207.0	206.0	209.9	210.7	205.3	201.2	201.8	210.2	212.4
1958	286.6	277.9	276.9	302.6	294.4	276.3	310.8	272.0	316.4	314.5
1959	279.1	288.7	287.2	314.9	305.1	288.1	318.9	281.3	327.6	326.9
Jan. 1960	284.2	298.3	292.7	322.4	311.6	293.3	323.7	286.8	333.5	335.1

Minneapolis Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	92.8	98.2	94.6	95.6	96.1	92.8	100.0	93.9	97.9	98.4
1939	101.9	105.0	104.2	113.5	110.7	102.7	113.4	103.6	114.5	117.2
1946	163.7	167.0	167.5	156.5	155.7	164.9	142.6	168.2	157.2	159.5
1949	218.7	218.7	217.7	205.1	206.9	224.4	192.6	211.7	205.8	208.0
1958	283.6	295.7	295.5	297.6	289.7	286.3	293.0	298.6	310.4	309.9
1959	292.3	304.7	295.9	307.8	299.2	295.7	300.1	306.8	319.8	321.1
Jan. 1960	294.7	307.5	306.9	311.4	302.4	298.3	302.4	309.1	323.0	324.7

New Orleans Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	93.3	96.3	93.4	86.5	90.6	93.3	93.7	91.5	89.5	86.5
1939	89.0	90.3	91.3	95.4	98.3	88.1	102.8	91.7	98.5	94.9
1946	148.9	147.7	148.2	138.6	142.8	151.2	138.7	145.4	142.0	138.7
1949	201.6	201.4	202.0	188.8	194.6	204.9	186.0	200.0	191.8	189.8
1958	251.1	256.7	257.4	258.5	257.9	253.5	261.0	259.1	266.7	263.4
1959	257.8	263.6	264.1	266.9	265.7	260.8	268.4	265.4	275.1	272.8
Jan. 1960	261.7	267.5	267.9	272.1	270.4	265.2	271.9	268.8	279.6	278.1

New York City Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	133.3	138.4	131.9	122.8	120.4	137.5	113.1	127.4	123.2	125.3
1939	122.1	123.3	122.5	130.6	125.9	125.6	123.7	119.6	130.0	133.3
1946	182.4	181.8	181.1	177.2	174.6	188.1	158.6	177.4	174.8	179.0
1949	240.8	243.7	242.7	242.8	238.2	247.5	217.3	238.3	240.0	246.4
1958	315.1	328.0	326.0	348.6	331.3	324.5	329.3	324.0	357.3	365.4
1959	329.0	342.7	340.1	367.7	346.7	339.3	343.1	338.3	374.1	386.8
Jan. 1960	333.9	346.9	344.9	372.6	352.6	344.2	347.3	342.0	378.3	389.8

Philadelphia Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	100.3	106.3	103.7	105.9	103.1	98.1	101.9	104.2	104.1	107.5
1939	99.2	102.6	102.9	105.7	104.1	98.2	102.0	105.0	105.5	106.7
1946	165.0	163.9	164.9	153.2	154.6	169.0	141.2	161.1	152.7	154.0
1949	220.5	220.6	220.3	209.0	209.0	224.3	190.3	216.3	205.6	209.9
1958	286.0	292.6	292.1	299.2	291.8	291.2	287.9	289.6	304.4	307.3
1959	297.6	305.9	305.5	318.2	308.6	304.6	307.2	301.7	327.1	328.5
Jan. 1960	299.1	307.2	308.8	319.2	310.9	306.5	308.5	303.1	327.8	328.9

Pittsburgh Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	113.3	118.8	112.8	111.2	107.1	115.4	89.6	112.2	104.6	112.9
1939	113.8	117.0	115.7	117.5	114.2	114.2	109.8	116.5	116.9	119.1
1946	169.5	169.0	168.0	156.6	155.3	173.5	140.1	166.4	153.2	158.9
1949	227.1	229.1	227.7	215.6	212.2	231.3	186.9	227.0	209.8	219.8
1958	289.7	299.4	298.1	305.5	294.0	295.5	289.8	299.5	311.8	317.6
1959	301.8	311.5	309.7	319.5	307.0	308.4	302.0	310.4	324.7	332.8
Jan. 1960	305.6	315.4	313.5	324.6	312.2	312.3	305.8	314.5	329.1	337.5

St. Louis Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	118.6	121.1	115.7	109.9	108.8	121.3	103.3	111.7	107.7	109.3
1939	107.0	110.2	109.9	118.7	116.4	107.6	114.3	110.3	119.2	119.8
1946	167.4	167.1	166.2	159.1	158.9	171.7	145.3	154.8	158.1	161.1
1949	220.7	221.4	220.7	212.8	212.4	226.8	197.5	217.3	213.6	215.7
1958	287.9	297.0	295.2	304.9	293.4	295.9	295.2	293.8	313.8	318.4
1959	296.4	305.4	303.6	315.0	301.7	305.5	304.9	301.6	323.9	329.8
Jan. 1960	298.9	308.0	306.1	318.4	305.4	308.4	308.1	303.8	327.6	333.4

San Francisco Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	87.7	93.7	90.4	97.5	96.5	86.1	95.5	91.8	95.9	99.0
1939	99.2	105.7	104.5	117.4	114.4	97.6	114.9	107.4	116.5	121.9
1946	157.5	159.7	160.0	157.9	159.0	160.5	151.5	158.4	160.0	159.3
1949	207.1	213.0	212.8	214.0	213.9	210.0	203.9	213.9	216.1	219.8
1958	274.9	289.8	289.0	311.5	299.5	278.9	304.3	292.9	320.8	326.7
1959	284.4	299.2	298.0	322.7	309.3	289.1	311.5	300.9	330.1	338.1
Jan. 1960	289.2	304.7	303.0	329.5	315.1	294.6	315.6	305.9	335.7	345.6

Seattle Area

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	84.5	92.2	89.2	101.7	95.1	82.4	100.8	92.2	100.5	105.9
1939	96.7	104.4	103.8	119.2	114.9	94.4	115.1	108.3	118.7	125.3
1946	152.9	158.3	157.9	161.2	159.8	153.3	156.0	158.9	164.2	167.1
1949	203.9	214.3	214.0	220.7	218.1	205.2	209.9	218.0	225.3	228.5
1958	256.4	279.9	280.2	306.0	293.2	253.6	302.0	294.4	320.8	324.0
1959	267.8	291.5	291.2	318.8	304.1	265.8	309.0	305.1	331.8	336.9
Jan. 1960	271.8	296.7	296.1	326.0	310.7	269.8	314.0	309.7	338.4	345.9

Washington, D. C.

Annual Averages By Cities	Residences		Apartments, Hotels, Office Bldgs.			Commercial & Factory Bldgs.				
			Brick and					Brick and		
	Frame	Brick	Wood	Conc.	Steel	Frame	Steel	Wood	Steel	Conc.
1926–29	106.6	107.7	107.9	107.1	105.9	106.0	104.0	108.0	106.4	108.4
1946	168.5	166.2	167.1	157.1	158.2	173.6	145.2	162.6	157.2	156.6
1949	223.1	223.3	223.1	213.5	212.6	227.2	194.8	218.6	210.4	214.6
1958	281.8	286.5	286.5	293.9	288.2	289.1	297.4	281.4	305.7	302.2
1959	289.7	294.7	294.2	303.1	295.9	298.1	303.3	288.1	314.0	312.2
Jan. 1960	294.5	299.6	298.8	308.9	299.9	303.1	306.0	293.5	318.2	319.0

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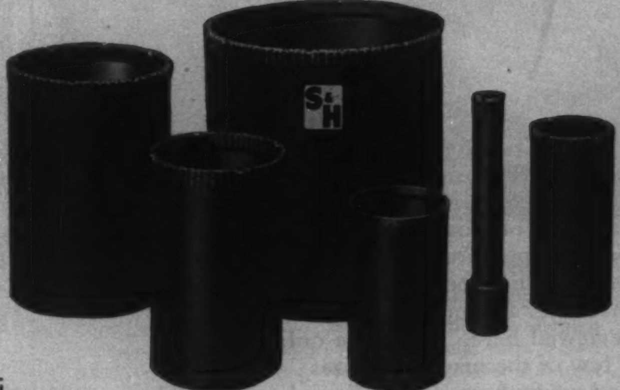

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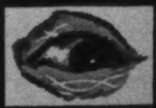

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KOEHRING HEAVY DUTY

new equipment review

Looking for new ways to get lower costs, *more profit* on your excavating, loading, erecting, off-road hauling, or paving operations? Then take another look at the new machines and methods reviewed here. These are only a few of the many new sizes and types of equipment recently added to the bigger-than-ever Koehring® line.

Long identified with heavy-duty equipment design *and quality,* Koehring has *doubled* its line in these last few years through a concentrated program of new product development. This program is being continued. So, *keep your eye on Koehring* for new opportunities to cut construction costs . . . and get *more work capacity* . . . earn *more profit* per dollar of equipment investment! For up-to-the-minute facts and figures, your Koehring distributor is the man to see. *Why not call him today?*

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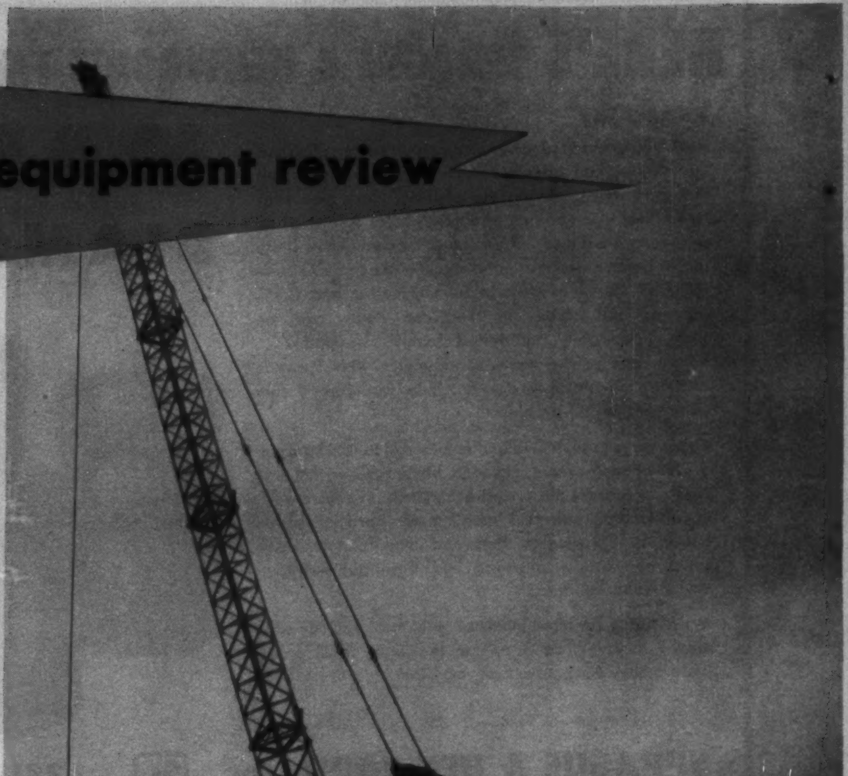


30-TON 330

30 to 120-ft. boom . . . 150 ft. with jib

Here's *extra* capacity, *extra* reach you can use with complete safety. Boom-angle indicator and operator reference guide show max. safe load capacity at every boom length and angle. High-strength pin-pad connected boom permits "2-man" boom-length changes. Power-lowered A-frame removes counterweight. Boom, outriggers also removable for roading. The 330 increases Koehring line on rubber to 8 models: 15, 25, 30, 35, 45, 55-ton truck cranes and 15, 25-ton Cruiser® cranes.

15 TON DUMPTOR

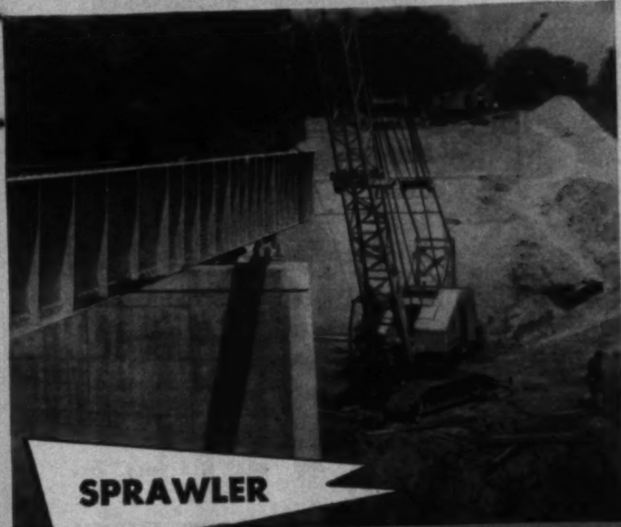
has pivoting seat . . . 2-way controls

No-turn shuttle hauling is more efficient than ever! Big, new 15 ton Koehring Dumptor® brings you 30,000 lb. payload capacity . . . 24 m.p.h. speeds in both directions . . . *plus* 2 sets of controls at pivoting seat. Operator always faces direction of travel. There's power steering . . . constant-mesh transmission . . . hydraulic speed-range clutches . . . torque-converter drive . . . instant gravity-dump, or *controlled*-gravity with hydraulic cylinders. A Koehring 8 ton Dumptor is available, too.

SKOOPER

revolutionizes digging . . . loading

Full-revolving, free-swinging Koehring SKOOPER™ digs, hoists, swings, dumps . . . then swings back to digging position *without traveling.* Twin hydraulic rams crowd the 2-yard bucket along smooth 7-foot level cut from *"stand-still"* position . . . or cut at any angle of bank slope. Eliminates high track or tire maintenance of conventional drive-in, back-out, skid-turn loaders. 3 types interchangeable buckets: rock . . . re-handling . . . and general-purpose. Excavator-crane convertibility.



SPRAWLER

outlifts its own weight by 14%

With pivoting outriggers sprawled into position, 545 SPRAWLER™ lifts up to *90,000 lbs.* (Weighs approx. 79,000 lbs.) Raise pedestals for ground clearance, or remove pedestals and swing outriggers against crawlers . . . and the 545 walks with 61,500-lb. load! Has 40 to 120-ft. pin-pad connected boom (with angle indicator) . . . max. *150-ft.* boom-and-jib. Strips for transport to approx. 47,500 lbs. *with crawlers intact.* 8 other Koehring crawler models: 10 to 95 tons (½ to 3-yards.)

34-E TRIBATCH

paves half mile of highway a day

That's right! 2,580 lineal feet of 24-foot-wide, 9-inch-thick concrete pavement can now be laid in a 10-hour day with one 34-E paver — the new Koehring 3-compartment TRIBATCH! You get 43% more output than with dual-drum 34-E — and with no change in your present batching, hauling, finishing equipment. Secret of high TRIBATCH output is in the continuous production of 3-compartment drum, which produces approx. 2 batches (74.8 cu. ft.) every minute.

K56

CIRCLE 95 ON READER SERVICE CARD

Petroleum

Petroleum Refinery Cost Index

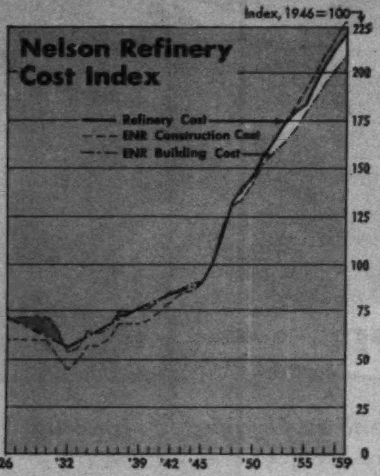
Compiled by W. L. Nelson, Petroleum Refinery Engineering Consultant; published by Oil & Gas Journal, Tulsa, Oklahoma—1946 = 100

	1926	1932	1939	1942	1945	1949	1953	1954	1955	1956	1957	1958	1959	Dec 1959
NELSON Refinery Construction Index..	*72.0	*56.6	*76.6	*83.7	*89.9	139.7	173.5	179.8	184.2	195.3	205.9	213.9	222.1	225.5
EQUIPMENT														
Heat exchangers....	75.0	60.0	76.0	93.5	91.9	133.0	174.9	171.7	156.8	190.7	203.6	181.2	178.9	192.1
Instrument (control)	....	90.0	89.5	85.5	90.6	122.0	151.8	154.6	162.9	182.1	187.4	194.9	201.0	198.6
Pumps, compressors.	....	....	91.5	87.5	93.9	135.9	162.5	166.5	172.2	164.0	206.7	214.7	226.5	227.3
Electrical equipment.	81.0	57.0	68.5	74.0	81.8	130.9	156.4	160.0	162.5	175.0	188.9	192.7	195.8	197.7
Internal Combustion engines..........	....	....	84.5	84.5	91.7	124.8	148.1	150.5	153.2	192.0	173.9	178.3	178.5	177.9
Miscellaneous equipment average.....	*94.0	*79.0	*82.0	*85.0	*90.0	†121.6	158.8	160.7	161.5	180.5	192.1	192.4	196.1	198.7
MATERIALS.........	....	68.0	82.0	86.3	89.7	143.6	172.4	174.6	176.1	190.4	201.9	204.2	207.8	208.9
LABOR..............	....	49.0	73.0	82.0	90.0	137.1	174.2	183.3	189.6	198.2	208.6	220.4	231.6	236.6

* Approximate, projection back to these dates from other cost sources.

† Used to compute Index until Apr 1952. Slightly different from the average of the miscellaneous equipment items shown

•Equipment prices, mainly from manufacturers as quoted to Oil & Gas Journal •Materials Components from Bureau of Labor Statistics Wholesale Price Index, Code 10-1 Iron and Steel and Code 13, Building Materials •Labor, half skilled and half common labor as quoted by Engineering News-Record. For base costs see ENR Oct. 8, 1953, p 115



Waterworks Plant Cost

To tailor a special cost index to the peculiar characteristics of any individual waterworks property, you can use the seven Weber Fick & Wilson component indexes, one for each major class of waterworks plant investment. These can then be weighted and computed to fit the makeup of a specific property.

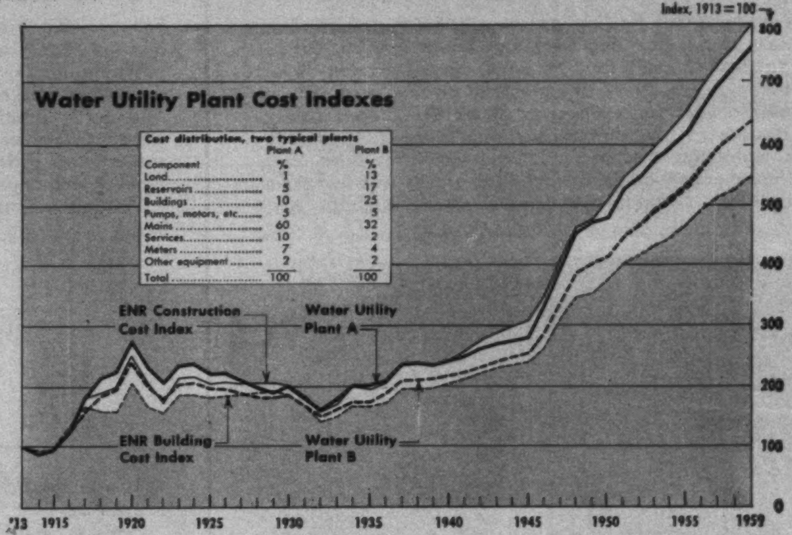
The way this works is illustrated by the two water utility plant cost indexes, A and B, as shown in the chart on the opposite page. These two plants differ in the ratio of mains to buildings or of service to reservoirs (table in chart).

The seven component indexes are based on the 13 cost indexes shown in the table for selected years.

The two sample water utility cost indexes shown, A and B, illustrate the effects of historical price changes upon two systems with identical kinds but dissimilar amounts of property.

The basic components of the two systems reflect the approximate dispersion of various classifications of property of two existing Pennsylvania utilities. For simplicity it has been assumed that: 1, all structures are made of brick and concrete; 2, the transmission and distribution systems are composed of castiron mains; 3, services are constructed of wrought-iron pipe; and 4, equipment includes motors, pumps, office, and contractors' items.

Tables showing the complete record of these water plant cost indexes by years from 1913 to 1958 are available without cost from: Mr. Henry H. Fick, Weber Fick & Wilson, Public Utility Consultants, 1801 North Front St., Harrisburg, Pa.



Cost distribution, two typical plants

Component	Plant A %	Plant B %
Land..................	1	13
Reservoirs..............	5	17
Buildings..............	10	25
Pumps, motors, etc.......	5	5
Mains..................	60	32
Services................	10	2
Meters..................	7	4
Other equipment.........	2	2
Total..................	100	100

Weber Fick & Wilson Waterworks Index Includes

Component Waterworks Cost Indexes—1913 = 100

	1926	1932	1939	1940	1949	1956	1957	1958	Dec. 1958	1959	Dec. 1959
Building											
Engineering News-Record Building Cost Index........................	185.0	140.9	197.4	202.8	351.8	490.8	508.7	524.7	534.8	547.8	552.8
E. H. Boeckh & Assoc brick & concr comm & factory bldg, Pittsburgh, Pa. area........................	210.3	161.7	223.9	224.2	413.2	548.7	576.7	596.8	611.3	625.6	634.4
ICC Railroad constr index, station & office buildings, Region 111 (1910-14—100)	185.0	142.0	168.0	177.0	369.0	486.0	.....	.....	521.0	.....	.....
Handy-Whitman brick buildings index, North Atlantic Division............	229.0	175.3	214.0	218.3	423.8	578.0	613.3	631.8	639.0	649.8	656.0
Materials											
6-in. & larger cast iron pipe, Delaware River Foundries.................	220.9	139.3	212.9	223.1	415.2	564.2	594.7	612.9	612.9	612.9	612.9
3-in. & under steel pipe, private sources	187.5	171.9	155.4	155.4	249.7	372.3	409.4	427.9	438.5	438.5	438.5
Motors, based on Handy-Whitman Index, North Atlantic Division......	134.2	134.0	147.8	147.0	232.0	371.0	419.5	436.5	442.0	448.8	451.0
Contractors' equipment, based on Marshall & Stevens index............	158.7	114.1	130.8	132.4	255.7	326.3	356.2	371.0	371.0	383.5	386.2
Office equip, based on Marshall & Stevens index........................	136.8	101.1	123.5	127.2	220.9	282.6	299.7	309.6	309.8	311.5	312.4
Meters, private sources..............	162.5	162.5	147.7	147.7	265.9	385.8	395.9	395.9	395.9	395.9	395.9
Common Labor, based on Engineering News-Record labor index, 20-cities average........................	288.4	224.7	350.5	367.9	763.2	1,136.8	1,201.6	1,281.6	1,306.3	1,351.6	1,382.6
Construction, based on Engineering News-Record Construction Cost Index	208.0	157.0	235.5	242.0	477.0	692.4	723.9	759.2	773.8	797.4	808.6
Gas utility costs, based on Handy-Whitman index, North Atlantic Division..	212.0	174.5	229.6	235.2	432.9	621.9	662.7	690.7	703.7	715.7	722.2

Refinery Cost

The Nelson index applies to the costs of constructing petroleum refinery and natural gasoline plants since 1946 and projected back to 1926.

It is published each month in the OIL AND GAS JOURNAL and is based on quotations from manufacturers of equipment used extensively in petroleum refineries and on proportions of steel, common building materials and labor that represent average refinery construction.

The materials component includes two Bureau of Labor Statistics wholesale price indexes—Iron and Steel and Building Materials—and a miscellaneous equipment average published monthly on the Refinery page of the OIL AND GAS JOURNAL.

The materials component (40% of the total index) is computed by the converting each of the two BLS price indexes to a 1946 =100 base. The Iron & Steel Index, on the new base, is then multiplied by 0.5. The BLS Building Materials Price Index, on the new base, is also multiplied by a factor of 0.2. And the miscellaneous equipment price average is multiplied by 0.3.

Then, all three elements are added to determine the materials component.

The labor component is half skilled and half common labor, taken from ENR. Each of these average wage rates for the curernt month are divided by their 1946 average to make two wage indexes based on 1946=100. Then, each of these indexes is multiplied by a factor of 0.5 and added.

Weber Fick & Wilson Waterworks Property Cost

Henry H. Fick, Weber Fick & Wilson, Public Utility Consultants, Harrisburg 1913=100

Year	Reservoirs	Buildings	Pumps and Motors	Distribution System	Services	Meters	Other Equipment
1946..	346.0	298.7	173.8	360.2	329.9	222.5	185.1
1947..	413.2	341.0	210.0	430.5	385.2	235.6	225.3
1948..	460.7	394.9	218.8	505.9	439.5	288.9	242.2
1949..	477.0	413.2	232.0	519.5	470.5	315.6	237.0
1950..	509.6	421.4	251.2	533.3	496.4	336.4	246.3
1951..	542.7	448.1	297.0	589.9	528.3	364.5	249.0
1952..	569.4	467.1	296.5	613.9	560.1	370.8	248.8
1953..	600.0	495.3	308.5	651.6	604.3	384.8	265.7
Dec'53	611.3	507.9	317.9	665.2	620.3	401.0	270.3
1954..	628.0	510.2	317.0	673.1	635.1	403.6	270.4
Dec '54	642.7	514.1	317.0	679.5	647.8	405.7	269.7
1955..	650.7	523.3	320.3	692.6	665.4	425.0	279.3
Dec '55	673.1	535.9	338.0	707.6	679.9	431.0	287.1
1956..	692.4	548.7	371.0	735.9	701.0	460.9	303.1
Dec '56	703.8	562.4	406.0	753.2	717.8	471.6	315.4
1957..	723.9	576.7	419.5	776.8	750.1	476.5	326.2
Dec '57	738.1	586.5	426.0	790.2	770.3	479.7	334.9
1958..	750.2	596.8	436.5	813.6	795.0	484.5	338.1
Dec '58	773.8	611.3	442.0	821.0	811.6	486.9	338.7
1959..	797.4	625.6	448.8	834.6	831.1	491.5	345.1
Dec '59	808.6	634.4	451.0	843.9	844.4	494.6	346.9

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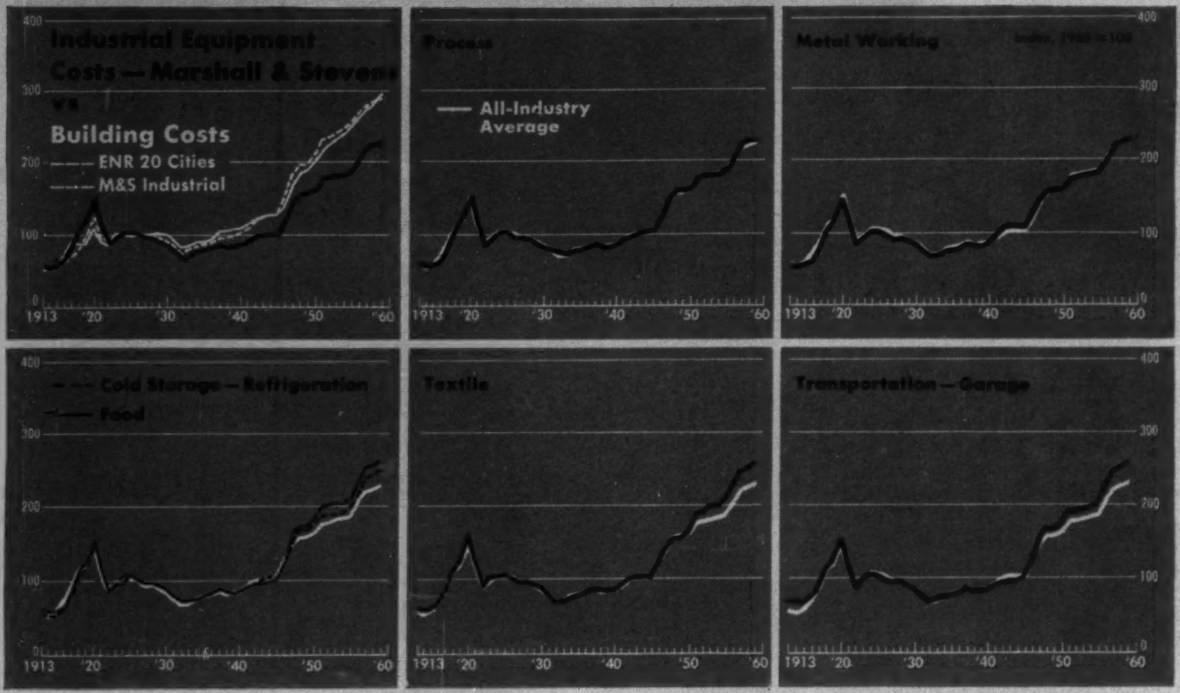
Equipment Cost & Price Indexes



Industrial Equipment: A Faster Spiral

Industrial equipment costs, including installation, rose much faster in '59 than '58. December '59 industrial equipment costs averaged 2.5% higher than December '58. Though this was much more than the December '57-December '58 0.9% gain, it was much less than the 5% jump in 1957, according to Marshall & Stevens.

Equipment costs also rose less than building construction costs for the second consecutive year. During '59, the Marshall & Stevens Industrial Building Cost Index increased by 3.3% and the ENR 20-Cities Building Cost Index climbed 3.4%.

But equipment costs rose much faster in some industries than the average indicates for '59. Biggest jump was 4.1% in metal working equipment. And increases of more than 3% came in equipment for aircraft plants, transportation garages, woodworking plants and construction contractors. By contrast, equipment costs for commercial enterprises moved only 1.1% higher.

Marshall & Stevens equipment cost indexes cover the composite of the entire plant. Machinery of various kinds, mechanical installation, furniture and fixtures, hand tools and other items are combined in proper proportion to their average occurrence in each plant and computed for 47 industries.

Prices of general building equipment showed mixed trends in 1959, according to U. S. Bureau of Labor Statistics Wholesale (Primary Market) Price Indexes. While plumbing equipment prices shot up 7.3% between January '59 and January '60, heating equipment prices dipped 0.4%. Industrial materials handling equipment prices, 2.9%, followed the Marshall & Stevens Industrial Equipment Cost Trend.

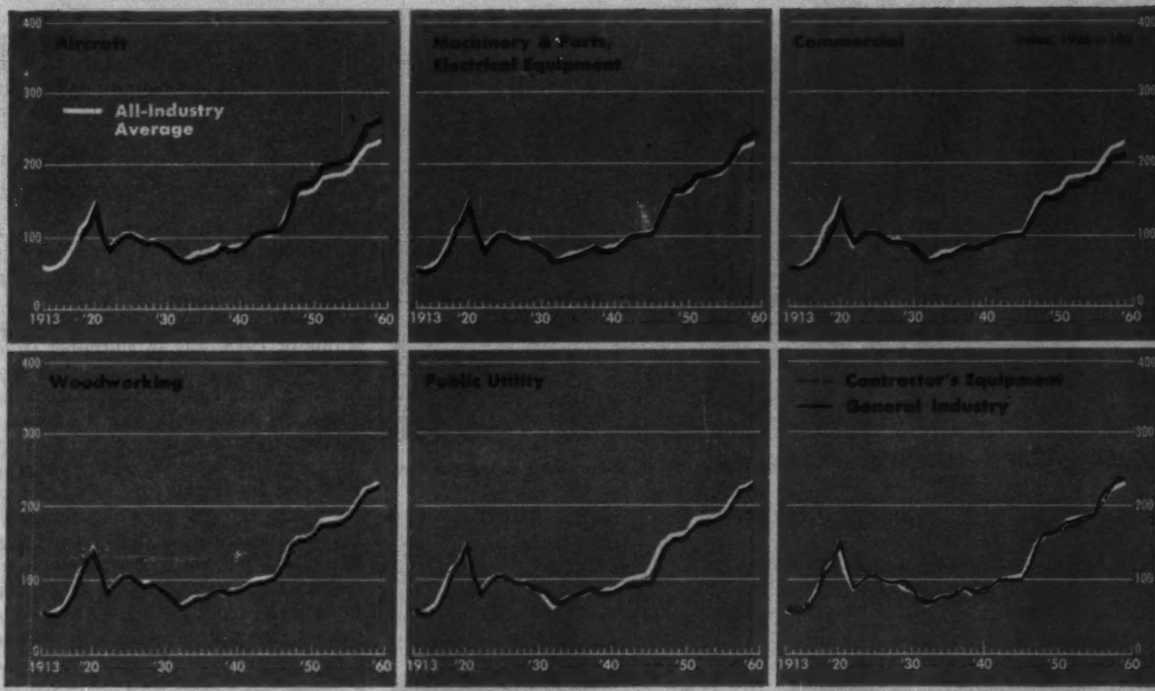
There's a chance that plumbing fixture prices may dip in the next three months, cancel out part of the sharp 1959 rise.

Manufacturers' and wholesalers' inventories are reported heavy.

Industrial Equipment Cost Indexes Marshall & Stevens, Inc. of Chicago, 1926=100

Industry	1913	1929	1932	1939	1940	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	Dec 1958	1959	Dec 1959
Average of All..........	57.9	91.9	66.1	84.8	86.6	103.4	123.2	150.6	162.8	161.2	167.9	180.3	180.5	182.6	184.6	190.6	208.8	225.1	229.2	231.3	234.5	237.0
Commercial (av. of 12*)..	58.8	91.8	67.6	86.8	89.8	105.2	120.9	146.9	158.6	152.7	159.8	171.8	170.6	174.0	183.3	182.8	195.9	207.8	211.6	212.9	213.6	215.2
Transportation—garage..	60.0	91.5	60.2	83.6	84.9	100.9	123.9	157.0	171.1	170.3	179.7	194.6	195.1	197.3	199.0	205.5	227.6	248.6	252.7	255.9	260.5	265.1
Public utility (av. of 2*)..	59.1	91.8	70.1	82.9	84.2	97.5	119.5	145.8	159.6	159.7	164.8	176.1	176.6	178.9	181.7	186.8	204.0	221.1	225.3	227.9	230.9	233.0
Process (av. of 9*)......	59.1	90.5	73.2	83.6	84.4	103.8	123.0	149.1	161.9	161.1	166.6	178.1	178.5	180.2	183.4	188.7	206.4	223.6	228.5	229.5	232.4	236.1
Food (av. of 10*)........	57.8	92.6	68.5	84.9	86.3	104.1	126.1	156.8	169.7	169.2	177.1	189.7	190.2	192.3	194.8	200.7	220.8	239.4	244.0	246.1	249.4	252.8
Metal working..........	57.1	92.3	67.9	83.6	88.6	110.7	131.2	151.3	161.8	161.8	166.9	178.0	178.6	180.7	184.1	189.3	206.8	224.4	228.7	230.1	234.7	239.5
Aircraft................	....	93.0	66.7	85.0	88.1	109.8	127.0	162.9	178.3	177.5	186.1	201.0	201.7	204.1	205.8	213.4	236.7	257.8	262.8	264.9	269.9	274.1
Mach & parts, elec eq...	59.2	92.0	68.0	83.4	85.4	106.8	130.3	156.6	167.4	167.7	175.0	188.6	189.2	191.1	194.6	200.2	218.7	237.5	242.2	244.6	248.4	251.8
Textile.................	61.1	91.1	67.8	83.7	84.7	101.8	122.1	146.6	157.4	157.3	165.9	192.1	193.3	199.9	199.8	206.6	228.9	247.8	252.2	254.6	258.1	261.4
Woodworking...........	56.6	92.0	67.2	83.6	84.6	100.9	123.0	149.6	160.4	160.4	165.5	176.6	177.1	178.9	182.3	187.5	204.7	221.8	225.8	227.8	231.6	235.5
General (av. of 7*)......	59.2	95.5	68.8	84.6	86.1	103.2	122.0	149.7	162.0	161.8	168.2	180.4	180.8	182.5	185.0	190.7	209.4	226.5	230.4	232.2	235.5	238.9
Cold storage—refrig.....	59.3	92.0	70.0	82.1	83.1	101.7	125.7	163.2	176.6	175.8	185.2	200.1	200.7	203.1	204.8	211.6	234.3	254.2	258.6	260.6	263.9	267.3
Contractors' equipment..	63.0	91.0	71.9	82.4	83.4	102.5	124.2	150.3	161.1	161.1	166.2	177.3	177.8	179.6	183.0	188.2	205.6	224.4	233.7	234.3	238.8	243.3

*** In each of these groups, MARSHALL AND STEVENS reports separate comparative equipment cost trends for: COMMERCIAL: Apartment, church, hotel, bank, library, restaurant, school, store, theater, hospital, dwelling, office GENERAL: Laundry, mining and milling, motion picture, printing, shipbuilding, warehouses, logging PUBLIC UTILITY: Steam power, electric power PROCESS: Distillery, cement, chemical, glass, petroleum industry, paint, paper, rubber, clay products FOOD: Bakery, bottling, brewery, candy, cannery-fish, cannery-fruit, creamery, dairy (flour cereal feed), packing-fruit, packing-meat**



Building Equipment Price Indexes, 1947-49=100

US Bureau of Labor Statistics Wholesale (Primary Market) Price Indexes

Item	1951	1952	1953	1954	1955	1956	1957	1958	Jan 1958	Jan 1959	Jan 1960p	Chge 1/59-1/60 %
HEATING EQUIPMENT	114.6	113.8	114.8	114.3	115.0	119.0	122.1	121.2	121.6	121.8	121.3	− 0.4
Oil burner	106.2	108.8	108.0	105.9	105.6	109.0	112.2	114.3	114.3	114.3	114.3	0
Boiler, cast iron, gas-fired	98.9	98.9	105.8	101.7	101.8	106.9	111.7	115.2	114.5	117.3	117.3	0
cast iron, oil/fired	135.3	136.7	144.3	148.1	151.5	159.7	171.4	175.3	173.6	181.5	181.5	0
" steel, oil-fired	124.3	124.3	128.5	130.9	131.2	135.1	141.5	147.5	145.7	151.6	151.6	0
Radiation, cast iron	124.0	125.8	136.1	140.1	142.5	148.8	157.3	161.0	160.4	164.3	164.3	0
Convectors, nonferrous metal	106.2	104.4	105.7	101.0	100.9	103.7	103.9	105.7	104.7	109.8	111.0	+ 1.0
Warm air furnace, oil-fired	126.4	124.4	126.5	129.1	128.3	132.7	141.1	140.4	144.1	141.3	139.7	− 1.2
" " gas-fired	112.9	110.9	112.2	113.9	114.4	115.0	108.1	96.2	102.1	98.5	96.5	− 2.1
PLUMBING EQUIPMENT	122.5	117.4	116.0	118.4	125.4	133.9	130.2	123.7	127.6	124.9	134.0	+ 7.3
Lavatory, enameled iron	133.9	126.8	132.1	135.8	138.6	142.5	142.5	130.3	140.5	131.2	144.9	+10.4
" vitreous china	131.2	124.1	100.3	110.4	112.7	115.9	115.9	117.7	115.9	121.7	135.4	+11.2
Sink, enameled iron	129.2	122.1	128.7	109.3	112.2	109.4	109.3	100.4	105.8	101.2	106.2	+ 4.9
" enameled steel	122.4	115.5	109.3	109.3	112.2	109.4	92.0	90.1	89.8	91.1	88.2	+ 3.2
Water closet, vitreous china	127.4	121.3	109.3	112.1	120.9	126.9	127.0	114.1	124.1	113.0	126.0	+11.5
Bathtub, enameled iron	129.5	121.4	123.5	126.1	127.4	120.1	130.0	118.9	127.1	118.8	132.3	+11.3
" enameled steel	122.4	118.5	118.6	118.6	120.2	122.5	117.3	115.8	112.8	118.1	121.3	+ 2.7
VENTILATION AND AIR CONDITIONING												
Centrifugal blower, 36-in dia	144.5	138.1	138.3	143.8	149.8	167.8	181.4	188.8	188.4	194.3	192.0	− 1.2
Propeller fan, 24-in to 28-in dia	136.4	135.0	138.3	143.6	147.5	162.6	166.8	164.8	164.8	164.8	164.8	0
Room air conditioner	.....	.....	.....	.....	95.1	90.5	87.4	83.8	85.2	79.2	76.3	− 3.7
ELECTRICAL MACHINERY & EQUIPMENT	121.9	120.3	123.7	126.2	128.2	138.4	149.0	152.2	151.0	152.6	155.9	+ 2.2
Distribution transformer, 15 kva	120.1	120.3	120.9	130.5	130.5	134.3	143.2	136.3	138.8	139.0	133.5	− 4.0
" " 45 or 50 kva	115.4	115.7	122.0	125.5	122.9	126.0	134.4	129.4	130.2	130.2	141.2	+ 8.4
Power transformer, 5000 kva	114.9	115.0	121.6	125.1	126.8	146.4	156.0	160.0	160.0	160.0	154.4	− 3.5
Generator, hydraulic turbine driven	130.5	134.3	142.3	145.5	147.9	169.7	182.9	194.0	192.7	198.5	198.5	0
" steam turbine driven	112.2	118.6	125.7	129.7	134.5	160.8	191.9	201.2	197.6	203.5	203.5	0
COMPRESSORS												
Stationary, electric, 100 hp, w.o. motor	126.8	126.8	132.7	136.5	148.9	170.2	180.8	196.2	194.9	212.8	212.8	0
" " 125 hp, " "	127.8	127.8	132.9	137.1	138.4	153.5	164.3	177.8	175.6	190.4	190.4	0
PUMPS												
Turbine, vertical deep well, 750 gpm	96.1	98.3	103.4	107.0	106.4	113.4	120.7	120.9	120.3	127.6	133.8	+ 4.8
Centrifugal, sgl stage, dbl suction 2" x 2.5" x 3"	133.2	132.6	136.1	134.9	137.0	156.4	169.7	175.2	172.0	180.6	175.0	− 3.2
Rotary, 50 gpm, 100 lb discharge pressure	112.5	110.9	121.4	126.2	133.6	145.4	154.0	154.2	154.2	154.2	171.0	+10.8
INDUSTRIAL MATERIAL HANDLING EQUIPMENT	127.3	127.1	129.8	134.0	139.2	153.4	167.3	164.3	167.9	168.5	173.4	+ 2.9
Conveyor, monorail, 1 ton capacity	127.2	127.2	130.6	132.9	135.7	148.2	157.4	155.5	161.2	154.6	164.9	+ 6.6
" package, gravity, 18-in width	126.5	125.4	132.6	136.3	140.3	151.0	159.2	162.9	163.8	164.8	165.8	+ 0.6
" belt, 36-in wide, 300-ft long	126.7	127.1	128.6	127.4	131.6	144.4	156.7	162.8	161.7	166.4	169.5	+ 1.8
" trolley, 4-in., 1,000-ft long	124.1	124.1	127.7	130.9	131.8	141.9	150.3	153.3	152.6	154.0	160.3	+ 4.0
Hoist, electric, lug type, 1 ton capacity	122.8	122.8	123.7	126.5	137.4	164.0	173.7	170.8	173.7	170.9	163.4	− 4.4
ELEVATORS & ESCALATORS												
Elevator, freight, 4,000-lb capacity, elec	114.4	115.1	117.0	119.3	122.1	130.2	140.9	141.3	143.8	140.6	142.1	+ 1.0
Escalator, 32-in. wide for 16- to 17-ft rise, elect	109.3	109.3	109.3	110.3	114.2	119.0	125.6	127.6	126.4	128.2	128.2	0
BULK STORAGE TANKS												
Under 10M gal	126.8	123.4	116.2	112.5	114.9	113.9	146.5	149.6	151.1	147.1	151.1	+ 2.7
10M gal	128.3	125.1	121.0	119.6	119.9	134.2	146.1	146.6	148.2	143.9	148.2	+ 2.9
CHAIN LINK FENCE	.....	.....	.....	.....	165.5	176.4	192.3	201.3	201.3	201.3	201.3	0

*p Preliminary

School Buildings for $10 a Square

$9.37 per sq ft in 1953. All-timber building houses dining room, some living quarters.

$8.49 per sq ft in 1956. Main building at the school has concrete block walls.

$10.38 per sq ft in 1959 for a three-classroom addition in concrete block.

A private boarding school has kept the cost of its new buildings close to a $10-per-sq-ft average over the past seven years while maintaining, even improving, quality.

Rumsey Hall School, Washington, Conn., started its building program in 1953, four years after it moved to a new campus. The program has been as continuous as available funds permit. Edward M. Foote, Jr., has been architect for all structures.

The first building, completed in the spring of 1953, was an all-timber structure with drop-siding walls. Subsequent buildings have had concrete block walls, which, by virtue of a special design of the blocks, provide a drop-siding effect. Also, because of this effect—which is produced by sloping the front face of the blocks and making it slightly longer than the rear face so that it overhangs the blocks on which it rests—they are called "shadow line" blocks. The rear faces of the block provide a flush, vertical, interior wall surface, which is given a coat of paint as its only finish. All buildings are roofed with split-ring-connector timber trusses, which eliminates the need for load-bearing partitions and thus permits unlimited flexibility in room arrangement.

The 1953 building, known as David G. Barr House, is one story, set on a concrete slab and roofed with asphalt shingles. It accommodates a 38x42-ft dining room, a kitchen, an infirmary and quarters for the chef and his family, for the nurse, for a faculty family and for three single persons. Rubber tile is used for the dining room, asphalt tile elsewhere. Dining room and lobby are panelled in natural pine. The building provides 6,008 sq ft and cost $9.37 per sq. ft. John C. Iffland Lumber Co., Torrington, Conn., was the contractor.

The first building to use shadow line concrete block was a single-story classroom unit of three rooms covering 1,056 sq ft. It was built in 1955. It cost $10.04 per sq ft, including the extra cost of using plate glass instead of plain glass in the two partition walls. C. M. Beach Co., New Milford, Conn., was the contractor.

The largest building in the program to date is Sanford House, constructed in 1956 to replace the school's main building, which had been destroyed by fire. It has a floor area of 8,090 sq ft, but being located along the edge of a hill, it also has a basement at the rear in which another 3,240 sq ft of space is provided.

The building is L-shaped. One leg, 80 ft long and spanned by 50-ft trusses

Foot

spaced 8 ft apart, accommodates a library, assembly room, faculty room, two classrooms and some living quarters in the rear. The other leg, 108 ft long and spanned by 30-ft trussed rafters spaced 2 ft apart, is devoted to living quarters for 24 boys, two faculty families and two single persons. Built-in wardrobes, bookshelves and desk tops were provided in the dormitory rooms. Cedar panelling is used from floor to ceiling in these rooms and half way to the ceiling in the dormitory corridor. Tile ceilings are used throughout instead of the gypsum board used in the earlier buildings.

The original plans had contemplated using only one end of the basement area to accommodate a furnace room, girls' locker room and an art classroom. The total cost to this point was $92,945 or $11.48 per sq ft on the basis of 8,090 sq ft.

However, it was decided also to finish the rest of the basement, 108x30 ft, under the dormitory leg, for storage space, a school store and a music room. Three sets of double doors were installed in the basement wall to give access from the lower terrace outside. The price of this extra basement work was $2,200, raising the total cost of the building to $95,235. By including the basement, the usable floor space is increased to 11,300 sq ft, and, on this basis the cost per square foot for the entire building is only $8.49. The contractor for this building was Hansen & Sons, New Milford, Conn.

The latest piece of construction, in 1959, was a classroom unit of three rooms, which also included a new boiler and a four-zone system to heat other rooms, 11 in all. One of the new rooms was a science laboratory, which required extra piping and equipment. A total of 1,378 sq ft was provided at a cost of $10.38 per sq ft. H. E. Crawford & Son, New Milford, Conn., was the contractor.

None of these costs include painting, which was done by school personnel, but otherwise they cover the complete facilities. Averaging the costs of the buildings built over the seven-year period produces a square foot cost of $9.47 if the area of the main building basement is included. Even ignoring this basement, the average cost is only $10.32. According to the Rumsey Hall School authorities, this good cost record during a period of rising construction prices is attributable to a capable architect with a continuing personal knowledge of the school and its needs, and to the employment of contractors willing to cooperate in cost saving methods.

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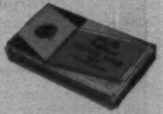

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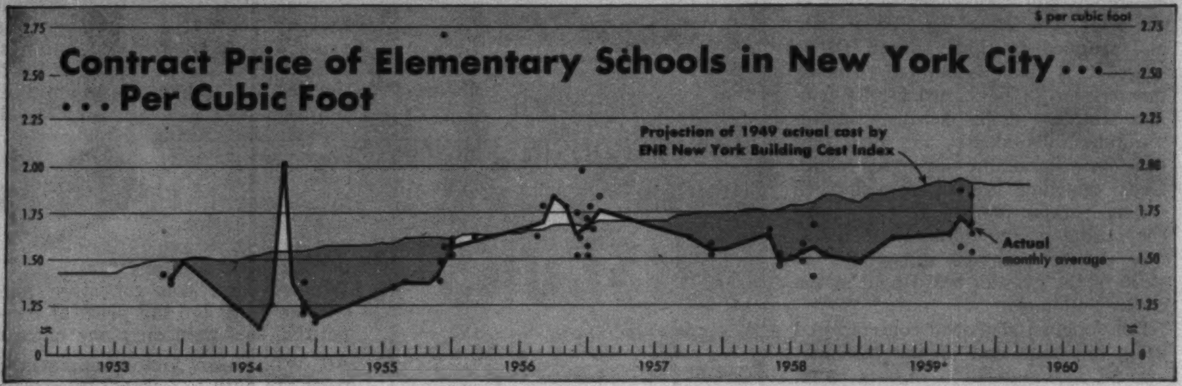
CEMENT GUN COMPANY

School Contract Costs

Competition



Unit Prices of Schools Built in New York City—by Years

Bureau of Design and Construction, Board of Education, City of New York

Elementary Schools

		per cu ft			per pupil sta			capacity, pupil stas		
	no.	min	aver	max	min	aver	max	min	aver	max
1947	(9)	$1.16	$1.25	$1.56	$1,255	$1,517	$1,991	558	1,182	1,550
1948	(5)	1.20	1.30	1.43	1,399	1,581	1,784	806	1,094	1,433
1949	(12)	1.03	1.18	1.40	1,148	1,334	1,638	868	1,181	1,588
1950	(11)	1.04	1.20	1.55	957	1,357	1,612	302	1,038	1,581
1951	(24)	1.11	1.39	1.69	1,447	1,710	2,451	358	885	1,274
1952	(9)	1.23	1.40	1.72	1,391	1,518	1,689	494	969	1,310
1953	(6)	1.37	1.41	1.49	1,202	1,488	1,570	792	944	1,238
1954	(9)	1.14	1.33	2.01	1,216	1,354	1,580	302	1,073	1,292
1955	(10)	1.35	1.61	2.71	1,338	1,653	2,059	133	1,117	1,384
1956	(12)	1.52	1.69	1.97	1,467	1,811	2,361	842	1,244	1,631
1957	(7)	1.52	1.74	2.20	1,564	1,731	2,136	487	1,134	1,400
1958	(12)	1.42	1.54	1.69	1,419	1,501	1,608	1,265	1,336	1,651
Unadj*	(12)	1.49	1.60	1.74	1,463	1,564	1,680	1,265	1,336	1,651
1959 Unadj*	(8)	1.53	1.67	1.87	1,560	1,673	1,824	1,220	1,280	1,323

Junior High Schools

		per cu ft			per pupil sta			capacity, pupil stas		
	no	min	aver	max	min	aver	max	min	aver	max
1947	(2)	$1.21	$1.23	$1.25	$1,270	$1,277	$1,284	1,810	2,068	2,326
1948	(1)	1.32	1.32	1.32	1,623	1,623	1,623	1,518	1,518	1,518
1949	(3)	0.99	1.09	1.26	1,261	1,330	1,553	1,518	1,819	1,998
1950	(1)	1.07	1.07	1.07	1,210	1,210	1,210	2,012	2,012	2,012
1951	(5)	1.32	1.36	1.38	1,408	1,511	1,645	1,558	1,842	2,020
1952	(7)	1.10	1.22	1.31	1,187	1,342	1,451	1,732	1,813	2,056
1953	(7)	1.10	1.22	1.29	1,176	1,280	1,462	1,766	1,968	2,185
1954	(6)	1.10	1.23	1.30	1,237	1,322	1,517	1,694	1,969	2,136
1955	(11)	1.25	1.44	1.63	1,370	1,580	1,904	1,772	1,950	2,114
1956	(6)	1.49	1.64	2.02	1,580	1,711	1,895	1,764	1,959	2,166
1957	(4)	1.53	1.65	1.74	1,730	1,709	1,815	1,769	1,924	2,183
1958	(2)	1.40	1.43	1.46	1,318	1,452	1,586	1,814	2,006	2,197
Unadj.*	(2)	1.49	1.49	1.49	1,395	1,506	1,617	1,814	2,006	2,197
1959 Unadj.*	(1)	.....	1.47	.....	.....	1,515	.....	.....	2,217	.....

* Unadjusted for abnormal foundation or site costs, which makes '59 prices slightly higher than if adjusted as are prices for 1947-58

...In New York City

Contract prices of new elementary schools edged up a bit in 1959 in New York City. But they still remained below 1956 and 1957.

Meanwhile, the gap narrowed slightly between contract prices and the cost of basic materials and labor, which rose to a record high, according to ENR's Building Cost Index for New York City (see charts above).

Contract costs per cubic foot of the eight new elementary schools awarded in 1959 ranged from $1.53 to $1.87 and averaged $1.67, unadjusted for abnormal site costs. The average is 4.4% higher than the comparable $1.60 unadjusted cube cost for 1958, which ranged from $1.49 to $1.74 for the 12 schools going to contract.

But the $1.67 average cube cost for '59, unadjusted, was less than the adjusted average of $1.69 in 1956 and the all-time high of $1.74 in 1957. When figures for 1959 are adjusted by removing abnormal site costs, they will fall perhaps 5% to 7% under average costs in 1956-57. In fact, the 1959 adjusted costs may equal 1955's average of $1.61. The Bureau of Construction, Department of Education, computes the adjusted figures from data supplied by the contractors. (Adjusted cost data for 1959 contracts will be available in a few months and will be reported in a later quarterly ENR Cost Roundup.)

Contract costs per pupil also increased in 1959, with the unadjusted average of $1,673 per pupil topping 1958's unadjusted average by $109, or 7%. However, per pupil costs in '59 were less than the adjusted average for 1956 or 1957 and only slightly above 1955.

When 1959 costs are adjusted for abnormal site costs, they will probably drop below '55, run further below '56 and '57.

Stiff competition and the Bureau of Construction's construction economy program, instituted in 1948, have contributed to holding the contract cost trend below the trend in basic prices of materials and labor. In only two periods of the 1950s did contractor prices climb above the cost trend. These two periods were 1951 and 1956, both times of shortages—of cement and steel in particular. During the last decade, the average cube cost of elementary schools rose less than 40% while per pupil costs increased less than 25%, on an adjusted basis.

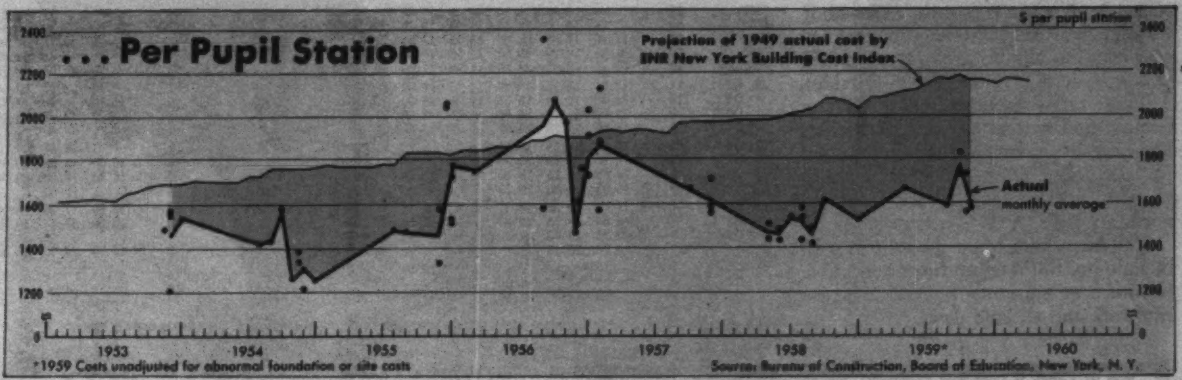
By contrast, the ENR Building Cost Index for New York jumped 60%.

Steel frame construction was used for four of the elementary schools awarded in '59 by the city, while the other four schools had reinforced concrete frames. Two of the steel frame schools had four stories, the other two had only three stories.

Cube costs for the steel frame schools ranged from $1.53 to $1.63, on an unadjusted basis. Costs per square foot ranged from $20.14 to $20.97.

For reinforced concrete frame schools, cube costs ranged from $1.63 to $1.87, while the contract price per sq ft ranged

Holds School Bids Down . . .



*1959 Costs unadjusted for abnormal foundation or site costs

Source: Bureau of Construction, Board of Education, New York, N. Y.

School Building Contract Unit Prices, New York, N. Y.—1958

No.	Size, min-aver-max pupil station	Large units	Min-aver-max COST* per pupil station	Min-aver-max COST* per cubic foot	Min-aver-max % of total building contract price* general constr	heating	plumbing	electrica
					%	%	%	%
Elementary, New 4-Story								
7	1,269-1,333-1,651	Aud; gym; lunch-playrm.	$1,419-$1,508-$1,608	$1.42-$1.52-$1.69	74.9-75.1-76.7	9.2-10.6-11.8	4.6-5.2-5.8	8.2-9.1-10.4
Elementary, New 3-Story								
5	1,265-1,340-1,452	Aud; gym; lunch-playrm.	1,436-1,491-1,585	1.46-1.57-1.65	72.9-74.3-75.4	12.0-11.3-10.6	4.6-5.0-5.3	8.9-9.5-10.1
New Combination Elementary and Industrial Arts High School, 7-Story								
1	2,680H.S.; 622 E.S.	Aud; gym; cafet; lunch-playrm.	1,640	1.55	71.6	8.8	6.8	12.7
Junior High, New 3-Story								
1	2,197	Aud; gym; cafet..........	1,318	1.40	71.0	11.6	5.9	11.5
Junior High New 2-Story								
1	1,814	Aud; gym; cafet..........	1,586	1.46	71.8	10.8	6.2	11.2
High School, New 3-Story								
1	3,104	Aud; gym; cafet..........	1,866	1.40	68.8	11.3	5.9	14.1
Addition & Modernization, 3-Story								
1-Elementary School: Auditorium and gymnasium.............			.....	....	76.4	13.6	4.6	5.3
1-High School: 19 Special classrms, 4 shops...................			.....	....	66.1	11.1	7.5	15.3

* Exclude abnormal site cost.

from $22.56 to $26.43 per sq ft, the latter being a four-story job while the others had three stories.

In 1958, five of the 12 elementary schools awarded had steel frames, while seven used reinforced concrete. Cube costs of the steel frame schools, all of which were four story, ranged from $1.49 to $1.58, unadjusted for abnormal site costs.

Costs per sq ft, also unadjusted, ranged from $18.80 to $19.70.

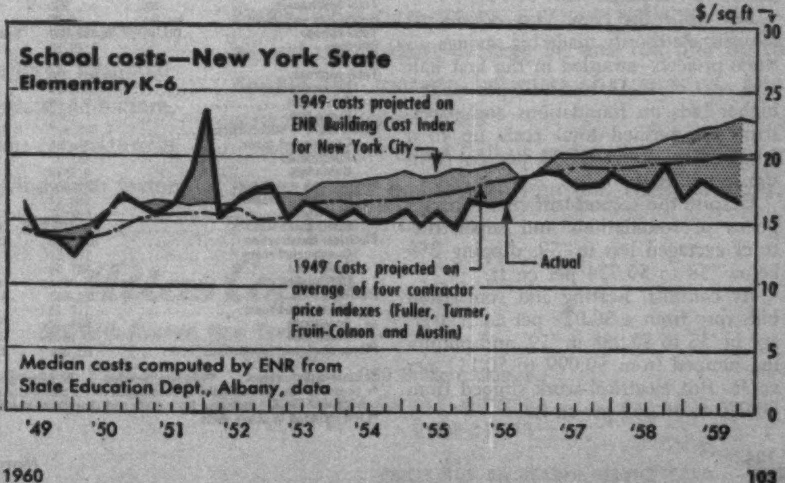
For six reinforced concrete frame schools let in '58, cube costs ranged from $1.51 to $1.74 and sq ft costs ranged from $17.85 to $21.63. A four-story reinforced concrete frame school cost $1.74 per cu ft and $21.72 per sq ft (all costs unadjusted).

Awards in 1958 also included a combination elementary and industrial arts high school. Costs of this seven-story reinforced concrete frame project were $1.55 per cu ft, on an adjusted basis, and on an unadjusted basis, $1.61 per cu ft and $20.69 per sq ft.

. . . and in New York State

Contractors' bid prices on new elementary schools in New York State continued to bump downhill in 1959. Median costs dropped further below building contractors' selling price indexes in the third quarter. Opening even faster was the gap between median contract costs and the trend in basic building materials and labor as measured by the ENR Building Cost Index for New York (chart below).

The median contract price dropped



to $16.35 per sq ft for eight schools with kindergarten through sixth grades in the sample of third quarter contracts analyzed by the State Education Department.

Third quarter costs ranged from $14.80 to $17.30 per sq ft for the five K-6 schools with two large units—auditorium, gym or cafeteria. The median cost of these schools dropped to $15.50 per sq ft, lowest since 1955 (see table).

These figures indicate that contractor competition netted local school districts real bargain prices for new school plant in 1959. But an unmeasured amount of credit goes to the elimination of unnecessary frills.

The New York State school cost data include built-in features but no movable furniture or equipment; exclude major site work and all land costs.

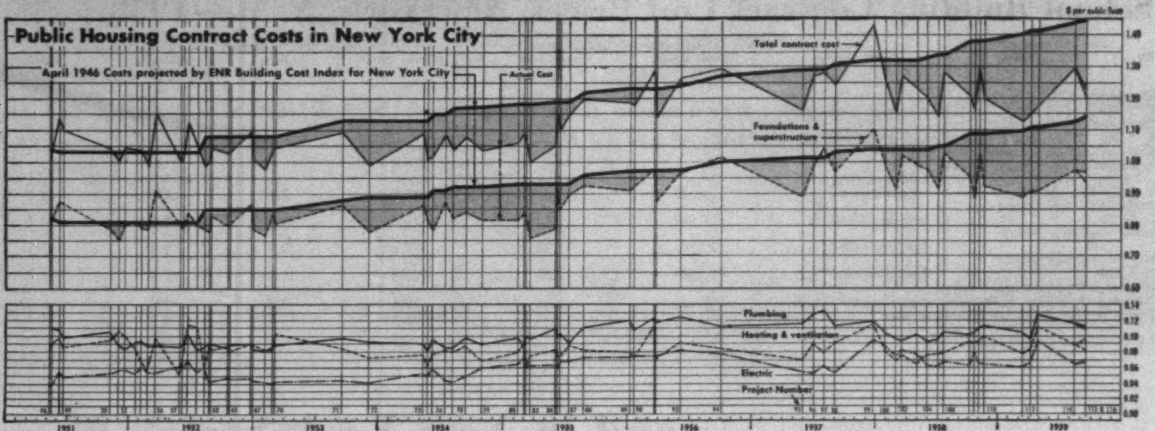
School Costs Per Square Foot in New York State

State Education Department, Division of School Buildings and Grounds

	No. of Schools K-6 Total	Elementary, K-6 — Dollars per sq ft for schools with . . . One Large Unit* Min	One Large Unit* Med	One Large Unit* Max	Two Large Units* Min	Two Large Units* Med	Two Large Units* Max	Three Large Units* Min	Three Large Units* Med	Three Large Units* Max	No. of Schools 7-12 Total	Secondary, 7-12 Dollars per sq ft Min	Med	Max
1949.....	29	$10.40	$14.00	$19.20	$12.00	$14.60	$18.70	.....	.....	.....	4	$13.20	$13.55	$16.20
1955.....	52	11.75	16.40	23.60	11.90	15.70	20.25	$14.90	$14.90	$15.90	13	12.55	17.10	18.50
1956.....	53	12.90	17.85	23.80	13.25	17.65	21.10	16.50	16.80	17.10	7	15.40	18.15	20.90
1957.....	50	14.65	19.28	25.20	12.90	18.10	21.75	.....	18.70	.....	10	16.40	18.61	20.60
1958.....	32	13.85	18.95	22.30	13.50	17.30	20.30	.....	.....	.....	8	15.90	16.55	19.70
'56, Q1..	11	14.95	15.10	18.40	14.45	16.80	18.50	.....	.....	.....	2	16.75	18.33	20.90
Q2..	18	14.40	16.50	18.55	14.60	18.00	19.00	.....	17.10	.....	2	15.80	16.98	18.15
Q3..	9	12.90	19.10	21.60	14.15	18.50	21.10	.....	16.50	.....	2	15.40	17.25	19.10
Q4..	15	16.00	20.70	23.80	13.25	18.85	21.00	.....	.....	.....	1	.....	18.60	.....
'57, Q1..	11	17.80	18.58	19.35	15.70	19.23	21.75	.....	18.70	.....	1	.....	18.51	.....
Q2..	14	14.65	19.60	25.20	12.90	18.10	19.00	.....	.....	.....	5	18.70	19.35	20.00
Q3..	11	18.60	19.15	19.40	14.40	17.78	18.40	.....	.....	.....	3	16.40	19.50	20.60
Q4..	14	16.95	20.80	25.20	17.60	19.00	19.60	.....	.....	.....	1	.....	18.90	.....
'58, Q1..	7	18.20	18.30	18.45	16.60	17.48	19.45	.....	.....	.....	2	16.60	17.30	18.00
Q2..	9	16.65	18.55	20.30	16.30	17.80	19.35	.....	.....	.....	4	16.00	17.13	19.70
Q2..	6	16.95	19.65	22.30	16.65	19.85	20.30	.....	.....	.....	..	.....	.....	.....
Q4..	10	13.85	20.13	21.00	13.50	16.38	18.50	.....	.....	.....	2	15.90	16.20	16.50
'59, Q1..	1	.....	.....	.....	.....	18.50	.....	.....	.....	.....	..	.....	.....	.....
Q2..	6	16.20	17.68	19.00	15.20	17.00	18.80	.....	.....	.....	..	.....	.....	.....
Q3..	8	14.70	21.00	21.80	14.80	15.30	17.30	.....	.....	.....	..	.....	.....	.....

* Large unit includes a general purpose room, gymnasium, auditorium, multi-purpose or other group activity room.

Public Housing Contract Costs



Construction Costs Dip, But Mechanicals Rise

Contractors' selling prices of new public housing in New York City averaged the same in '59 as in '58—$1.192 per cu ft compared with $1.191.

But while the New York Municipal Housing Authority made big savings on three projects—awarded in the first half at a cost of $1.13 to $1.17 per cu ft—higher bids on foundations and superstructures pushed total costs up to a range of $1.20 to $1.30 per cu ft in the second half.

Despite the second-half rise, contract prices of foundations and superstructures averaged less in '59, dipping 2% below '58 to $0.924 per cu ft.

By contrast, heating and ventilation bids rose from a $0.079 per cu ft average in '58 to $0.088 in '59, and plumbing jumped from $0.099 to $0.111 per cu ft. But electrical work slipped from $0.070 to $0.069 per cu ft.

Public Housing Unit Prices—1959

Awards by New York City Municipal Housing Authority

Project Number Project Name	(111) Samuel J. Tilden b	(112) Woodrow Wilson a	(113) Benj. Franklin II cef	(114) Stapleton ad	(115) Forest South bg	(116) Van Buren f
Total constructed rooms..........No.	4,251	2,026	3,776	3,012	2,635	1,308
Total apartments................No.	998	398	944	693	619	320
Rooms per apartment.........Av. No.	4.26	5.09	4.00	4.35	4.26	4.09
Total cubage................Cu. Ft.	8,888,637	3,961,200	8,013,320	6,441,281	5,545,418	2,988,196
Bid date..........................	3/19/59	4/3/59	4/28/59	8/25/59	9/15/59	9/15/59
Cost per:						
Total contract....................	$10,008,070	$4,535,345	$9,389,896	$8,415,397	$6,667,933	$3,688,238
Constructed room..............	2,354.29	2,238.57	2,486.73	2,793.96	2,526.69	2,819.75
Apartment.....................	10,028.13	11,395.34	9,946.92	12,143.43	10,772.11	11,525.74
Cubic foot....................	1.1259	1.1449	1.1718	1.3065	1.2024	1.2343
Foundations & superstructure........	7,865,607	3,575,645	7,251,000	6,287,670	5,193,819	2,905,417
Constructed room..............	1,850.30	1,764.88	1,920.29	2,087.54	1,968.10	2,221.27
Apartment.....................	7,881.37	8,984.03	7,681.14	9,073.12	8,390.66	9,079.43
Cubic foot....................	0.8849	0.9027	0.9048	0.9762	0.9366	0.9723
Heating and ventilation..............	681,600	327,000	693,595	715,000	504,972	242,028
Constructed room..............	160.34	161.40	183.68	237.38	191.35	185.04
Apartment.....................	682.97	821.61	734.74	1,031.75	815.79	756.33
Cubic foot....................	0.0767	0.0825	0.0866	0.1110	0.0910	0.0810
Electrical construction..............	536,500	254,200	511,824	598,990	371,456	203,968
Constructed room..............	126.21	125.47	135.55	198.87	140.76	155.93
Apartment.....................	537.58	638.69	542.19	864.34	600.09	637.40
Cubic foot....................	0.0604	0.0642	0.0639	0.0930	0.0670	0.0683
Plumbing..........................	924,363	378,500	933,477	813,737	597,686	336,825
Constructed room..............	217.45	186.82	247.21	270.17	226.48	257.51
Apartment.....................	926.22	951.01	988.85	1,174.22	965.57	1,052.58
Cubic foot....................	0.1040	0.0955	0.1165	0.1263	0.1078	0.1127
Piling, abnormal foundations..........	51,000	280,000	882,000	142,000	175,000	110,000

*a state-aided project *b federally-aided *c housing without cash subsidy *d cost of complete boiler plant included *e proportionate part of boiler cost included *f part 4 city-aided program. Special standards *g 35,257 cf deducted from cubage and $94,814 deducted from costs and charged to Van Buren Houses for shared boiler room. *h city-aided program *i not included in above costs

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1st Quarterly Cost Roundup

Heavy Construction Cost & Price Indexes

More Bargain Prices Now Available

Contractors' bid prices for new heavy construction in 1959 dropped below '58 in the face of rising costs of the Four M's: Manpower, Materials, Machines and Money. And there have been only faint indications that bids might be firming up.

As competition increased late in '59 and more bidders competed for each new job, low bids remained below '58 and, on some types of work, dropped even further below their recent highs.

However, by the fourth quarter of '59, while competition increases among highway contractors for the new projects let by nine out of ten states reporting to ENR, bid prices increased in five states (table below).

Moreover, the U. S. Bureau of Public Roads Composite Mile Bid Price Index for federal-aid projects let in all states inched up in the last quarter. However, it remained 3.6% under its late 1957 peak and 2.4% below the fourth quarter of '58.

A big increase in available highway and bridge construction in the second quarter of this year should take some, but not much, of the competitive pressure off contractors. Lettings, up sharply in the first three months, will soar much higher in the April-June period. But contractor capacity is so large that there may be just as many bids per project in the first half of '60 as in the last half of '59, when new work fell way off. Bid prices would reflect such stiff competition by remaining low, or increasing at a very slow pace in the next few months as costs continue to move up.

January '60 costs of irrigation and hydroelectric plant construction in 17 states and Alaska rose slightly, according to the Composite Cost Index computed by the U. S. Bureau of Reclamation's Denver Office. However, January's quarterly value of 1.27, based on 1949-51=1.0, was 2% under the January, '58 record and nearly 1% under January '59.

Though the Composite Index was more stable in the latest 12 months than any similar period since 1945, this was due to offsetting ups and downs in costs of different types of construction and equipment costs. For example, the Building Cost Index for January was 4% above a year ago. But costs were off by about 2% to 3% for canals, tunnels, irrigation laterals and drains.

Heavy construction bid prices in the west steadied in the second half of '59.

Highway Price Indexes in 11 States and the US

Reported by state highway departments — US Bureau of Public Roads Indexes, 1925-29=100

Base Year=100:	California 1940	Colorado 1949	Florida 1950	Idaho 1950	Michigan 1940	Nevada 1955	New York 1940	Oregon 1940	South Dakota 1940	Texas '49-'53	Washington 1940	Excavation[1] 17,491* cy Price $0.35†	Excavation Index 100.0	Surfacing[3] 3,726* sy Price $2.22†	Surfacing Index 100.0	Structures: Reinf. Steel 16,000*lb Price $0.052†	Structures: Struct. Steel 4,325*lb Price $0.067†	Structures: Struct. concr. 68* cy Price $22.15†	Combined Index 100.0	Composite Mile Index 100.0	ENR Construction Cost Index 100.0
1956 Av....	247.3	92.8	122.2	118.3	185.4	118.2	252.2	193.8	198.8	105.0	214.1	0.38	108.2	3.89	175.5	0.131	0.202	54.33	253.8	163.3	334.6
1957 Av....	264.3	97.3	127.2	116.1	173.0	124.3	268.5	187.8	205.6	108.2	226.4	0.40	113.5	4.02	181.2	0.137	0.218	56.92	267.0	170.0	349.8
1958 Av....	236.5a	96.1	128.2	96.4	171.4a	113.3	257.2a	172.1a	184.5	115.9a	211.1a	0.39	112.5	4.02	181.1	0.130	0.193	54.92	253.3	167.5	366.8
Q1......	241.8	93.7	114.5	105.8	H1;	117.2	277.1	159.3	179.6	109.2	217.7	0.39	110.3	4.02	181.3	0.131	0.201	54.99	255.6	167.1	359.7#
Q2......	231.0	102.5	116.9	92.1	175.0	108.0	266.8	180.0	213.5	118.3	210.1	0.40	114.5	4.03	181.7	0.130	0.192	54.85	252.9	168.5	365.9#
Q3......	228.5	99.9	139.0	97.0	172.7	124.2	257.5	181.1	175.9	120.8	211.0	0.39	111.4	3.97	179.0	0.130	0.186	54.55	251.1	165.7	373.7#
Q4......	238.5	92.7	132.6	90.5	162.7	103.3	227.3	167.8	209.8	115.2	205.5	0.40	113.7	4.04	182.2	0.129	0.191	55.28	253.7	168.5	373.9
1959 Av....	244.0	93.0	130.3	93.6	.....	106.1	230.3	176.3	204.4	111.0	194.0	0.38	109.1	3.99	179.9	0.127	0.184	53.42	246.5	164.6	386.29
Q1......	216.1	97.2	135.4	108.9	163.0	110.0	246.7	201.4	216.9	117.0	189.0	0.40	113.4	4.02	181.3	0.128	0.187	54.93	251.2	167.6	377.56
Q2......	270.4	92.5	130.1	88.4	164.1	102.4	226.8	165.4	194.1	112.1	194.6	0.37	104.8	4.03	181.7	0.125	0.182	51.90	240.7	163.1	384.23
Q3......	260.3	89.3	126.2	77.5	163.8	105.7	229.6	165.4	215.5	108.4	196.9	0.38	108.6	3.94	177.6	0.126	0.183	54.05	247.1	163.4	392.64
Q4......	229.1	93.0	129.3	90.6	.....	106.2	217.9	172.8	191.2	106.5	195.4	0.38	109.4	3.97	179.0	0.130	0.184	52.80	246.9	164.4	390.74

*[1] Common excavation plus other expressed as equivalent common excav. *[2] Portland cement concrete plus other expressed as equivalent port. cem. concr. ** Fixed quantities used for establishing price trend. *† Prices for base year index. *# Last month of quarter * Based on 1925-29=100. *a ENR average of quarterly indexes.

Irrigation and Hydro Cost Indexes

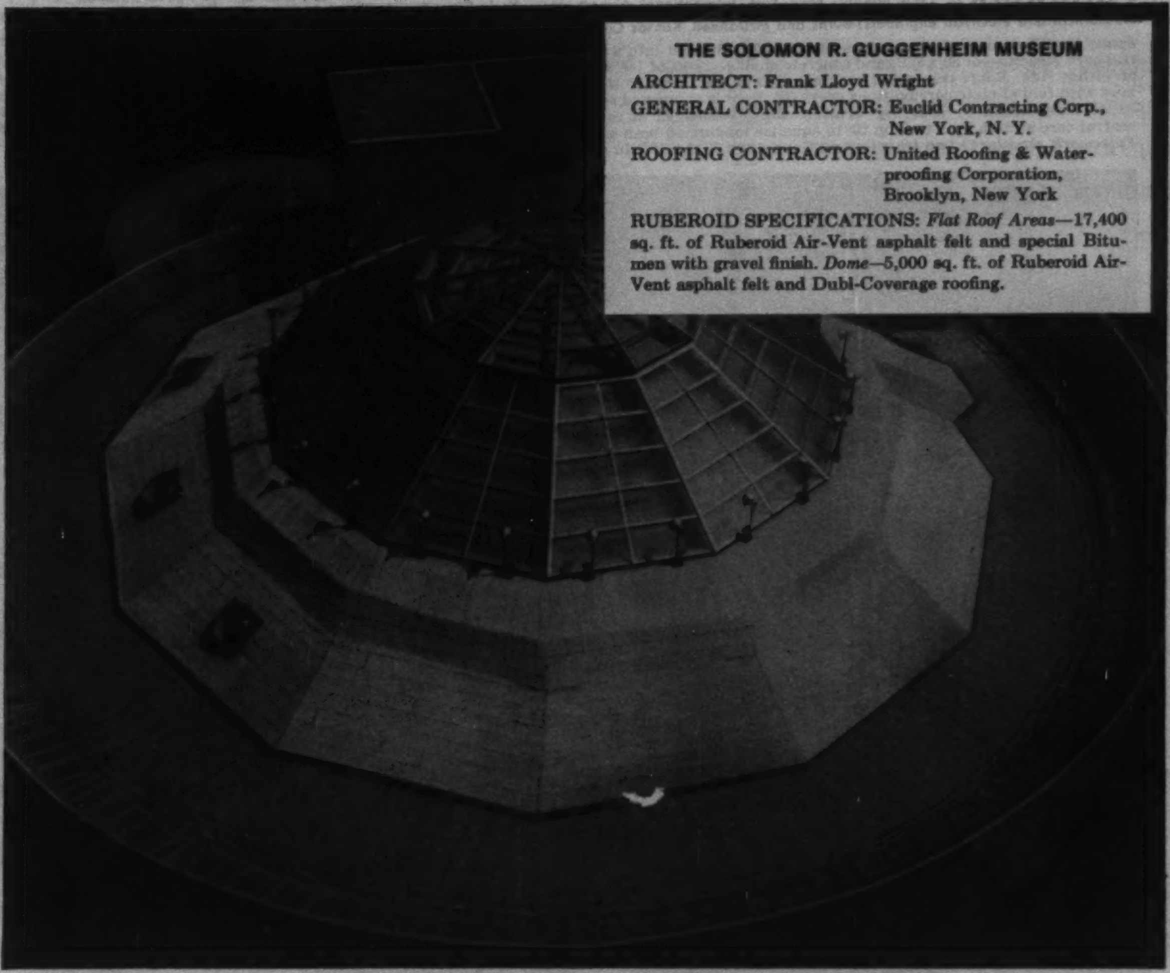
US Bureau Reclamation, Denver Office, 1949-51 = 1.0

Class of Construction	January 1940	January 1946	January 1949	January 1957	January 1958	1959 Jan.	1959 Oct.	1960 Jan.
Composite index	0.47	0.76	1.04	1.24	1.30	1.28	1.26	1.27
Dams, earth	0.50	0.85	1.12	1.15	1.23	1.12	1.12	1.13
Dam structure	....	....	....	....	....	0.99	0.99	0.99
Spillway	....	....	....	....	....	1.27	1.26	1.28
Outlet works	....	....	....	....	....	1.34	1.34	1.36
Dams, concrete	0.47	0.76	1.00	1.11	1.16	1.13	1.13	1.14
Dams, diversion	....	....	....	....	....	1.37	1.39	1.39
Pumping plants, bldg & equip	0.48	0.69	1.02	1.43	1.46	1.47	1.48	1.48
struct, reinf conc, & improv	0.43	0.68	1.06	1.31	1.36	1.33	1.33	1.33
equipment	0.55	0.70	0.98	1.56	1.58	1.65	1.70	1.70
pumps & prime equip	....	....	0.94	1.64	1.66	1.73	1.78	1.78
access elec & misc equip	....	....	1.05	1.41	1.44	1.50	1.54	1.55
steel penstocks, disch pipes	....	....	1.10	1.66	1.72	1.72	1.77	1.77
Canals	0.46	0.78	1.08	1.18	1.19	1.13	1.11	1.11
Earthwork	....	....	....	....	....	1.09	1.06	1.06
Structures	....	....	....	....	....	1.24	1.16	1.16
Conduits (tunnels)	....	0.68	1.02	1.24	1.30	1.29	1.26	1.26
Laterals and drains	0.41	0.70	1.02	1.26	1.32	1.32	1.28	1.28
Earthwork	....	....	....	....	....	1.11	1.00	0.97
Structures	....	....	....	....	....	1.59	1.46	1.46
Primary roads	0.48	0.82	1.06	1.19	1.24	1.24	1.24	1.25
Secondary roads, unsurfaced	0.50	0.86	1.14	1.13	1.19	1.19	1.17	1.18
Bridges, steel	0.46	0.76	1.06	1.47	1.52	1.48	1.48	1.48
Power plants, hydro, bldg & equip	0.50	0.71	1.01	1.44	1.48	1.51	1.52	1.52
struct, reinf conc, & improv	0.44	0.70	1.05	1.30	1.36	1.34	1.34	1.34
equipment	0.55	0.73	0.96	1.53	1.54	1.61	1.65	1.65
turbines & generators	0.56	0.76	0.97	1.57	1.58	1.64	1.68	1.68
access elec equip	0.54	0.65	1.01	1.44	1.48	1.52	1.56	1.56
misc equip	0.51	0.70	1.05	1.43	1.40	1.44	1.48	1.49
Concrete pipe lines	0.55	....	0.96	....	1.29	1.33	1.36	1.36
Switchyards & substa	0.54	0.59	0.99	1.59	1.60	1.61	1.64	1.65
Transm lines, wood pole 115 kv	0.50	0.89	1.24	1.09	1.16	1.23	1.23	1.25
Poles and fixtures	....	....	....	....	....	1.10	1.09	1.12
Overhead conductors & devices	....	....	....	....	....	1.34	1.34	1.35
Steel tower 230 kv	....	....	....	1.37	1.43	1.44	1.46	1.46
Permanent genl property, bldgs	0.44	0.63	0.95	1.30	1.30	1.35	1.40	1.40

Western States Unit Price Indexes

Estimates Section, San Francisco District, Corps of Engineers, 1st Half 1946 = 100

	Unit	1946 1st half	1949 1st half	1957 1st half	1958 1st half	1958 2nd half	1959 1st half	1959 2nd half
Index. 1st Half '46=100		100.0	132.2	170.37	163.07	182.02	176.18	176.58
Items used in index	Unit	Based on these average unit prices						
Cr rock base course	ton	2.81	2.29	3.41	3.65	2.69	3.35	3.03
Plant mix aggregate	ton	4.82	4.43	6.92	7.28	6.83	6.97	7.84
Plant mix asphalt	ton	22.00	26.85	21.50	25.19	23.00	21.00	26.00
Cover aggregate	ton	5.09	5.65	7.13	7.02	6.96	6.84	6.95
Structural concrete	cy	50.65	65.07	82.00	79.00	84.00	82.00	82.00
Pavement concrete	cy	13.20	19.69	23.00	20.00	28.00	22.00	24.00
Reinforcing steel	cwt	9.60	12.70	17.00	17.90	18.00	16.00	16.00
Cement	bbl	2.84	4.98	5.11	5.00	5.18	4.83	4.87
CM pipe 12"	lf	2.20	3.03	4.48	4.33	4.52	4.30	4.59
CM pipe 24"	lf	4.05	5.26	8.04	7.56	7.87	7.97	8.08
RC pipe 18"	lf	3.50	4.27	6.24	6.38	6.58	6.71	6.87
RC pipe 36"	lf	8.29	10.47	13.75	12.72	13.20	14.52	14.61
VC pipe 6"	lf	1.87	2.39	3.70	3.31	3.90	3.67	3.63
VC pipe 8"	lf	2.22	2.80	3.67	4.01	4.65	4.65	4.46
Sewer manhole	1/10 ea	16.50	20.80	28.20	27.40	30.00	29.40	27.70
Roadway excavation	cy	0.67	0.96	1.05	1.09	1.15	2.11	.97
Structural excavation	cy	2.49	4.27	5.42	3.78	4.25	4.16	4.62
Watering	M gal	2.13	2.13	1.92	1.86	1.86	1.85	1.95
Flat wheel roller	R-hr	5.47	7.82	10.06	11.31	11.00	11.00	14.21
Piling, green wood, fur	lf	0.64	0.65	0.895	1.09	0.88	1.00	.93
Piling, treated, fur	lf	1.25	1.45	2.75	1.77	2.07	2.16	2.07
Timber in place	100 fbm	16.60	26.33	50.50	39.30	58.30	59.80	52.70
2" Galv steel pipe	lf	1.04	1.38	1.62	1.67	1.66	1.40	1.56
Cast-iron pipe 6"	lf	2.86	4.17	5.42	5.40	6.29	5.05	5.59
Cast-iron pipe 8"	lf	3.80	6.47	6.07	6.27	7.55	6.03	5.93
Gate valve 8"	1/10 ea	7.06	9.70	10.08	11.50	12.10	12.40	10.80
Total in dollars		193.65	256.01	329.93	315.79	352.49	341.18	341.96



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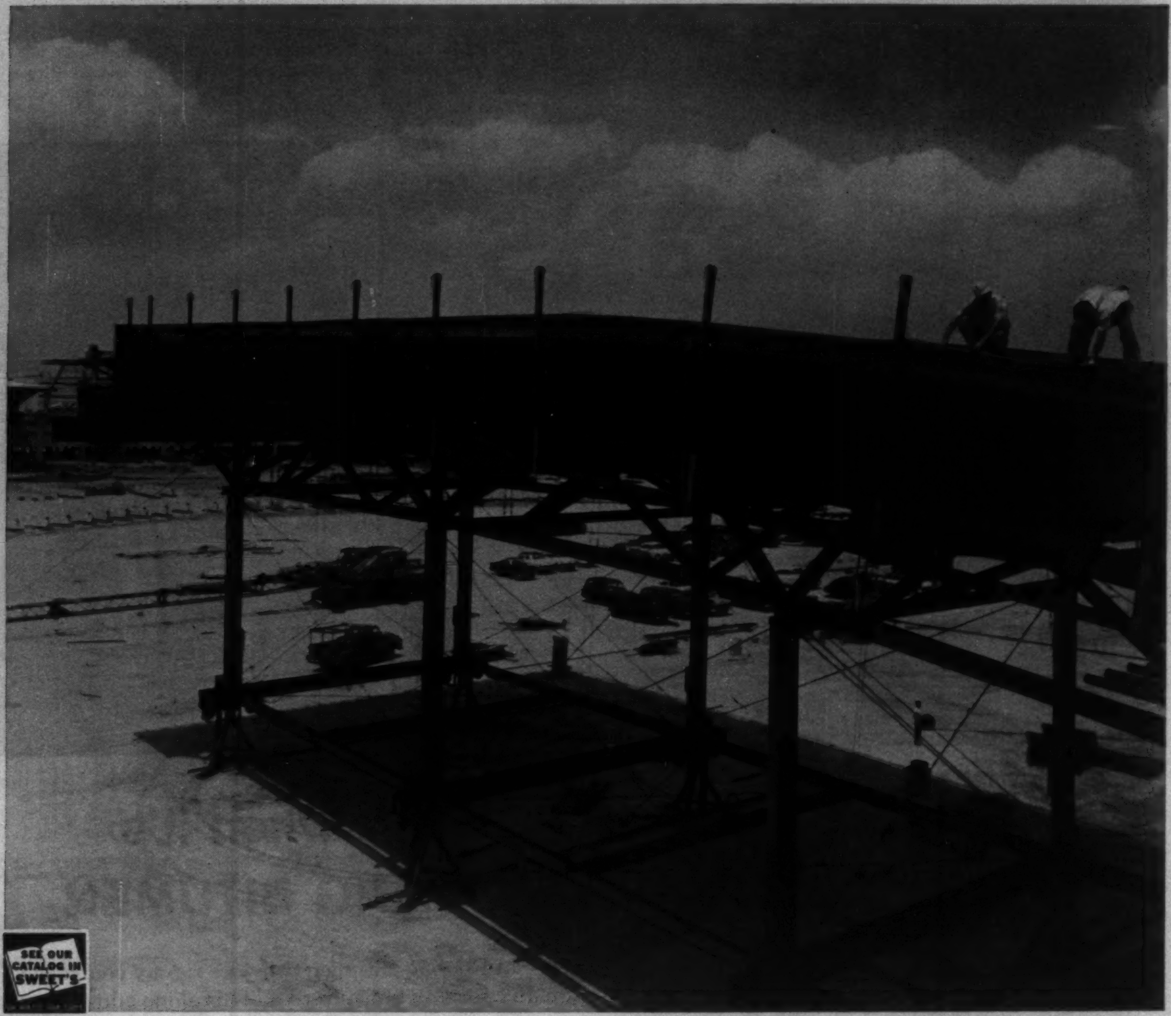
Space provided: overall dimensions of 412′x821′, divided into a central core structure of 80′x821′, and concrete shell sections of 166′x821′ on either side. *Roof:* reinforced concrete slab of 4¾″ average thickness with folded plate corrugations every 30′. Roof is supported every 30′ at outer edges by four 2½″ tension cables connected at top of central core section by a tension tie to equalize loading on both sides. *Falsework structure:* two traveling sections, each 60′ by 166′ in size. Each section consists of two parallel chord trusses and glulam floor beams which support the folded plate roof framing. *Procedure for moving forms:* after concrete roof sections had hardened to 2500 p.s.i. tension cables were tightened to support the section, and falsework was lowered onto rails by hydraulic jacks. After being moved into position for next pour, falsework was placed upon tripod sand jacks which provide support until the next move.



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Building Costs in Detroit—Per Cubic Foot

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Classification of Buildings	Aug 1915	Aug 1920	Feb 1 1925	Jan 1 1930	Jan 1 1931	Jan 1 1932	Jan 1 1933	Jan 1 1935	Jan 1 1936	Jan 1 1937	Jan 1 1938	Jan 1 1940	Jan 1 1941	Jan 1 1942	Jan 1 1943	Jan 1 1944
FACTORIES, & WAREHOUSES																
Fireproof, Under 300,000 cf	$0.14	$0.315	$0.23	$0.22	$0.165	$0.15	$0.14	$0.165	$0.19	$0.215	$0.25	$0.25	$0.28	$0.30	$0.31	$0.32
Fireproof, Over 300,000 cf	.125	.29	.22	.21	.16	.145	.125	.15	.17	.20	.21	.23	.25	.26	.275	.285
Mill Construction	.10	.225	.16	.155	.115	.11	.10	.12	.14	.16	.17	.16	.17	.185	.20	.21
Ordinary	.09	.21	.145	.135	.10	.095	.085	.10	.115	.13	.14	.135	.16	.175	.19	.20
Frame	.075	.17	.11	.10	.075	.07	.07	.085	.10	.11	.10	.09	.12	.14	.15	.165
STORES																
Fireproof	.33	.52	.40	.385	.30	.295	.26	.31	.355	.39	.42	.42	.46	.50	.53	.55
Ordinary	.165	.375	.265	.25	.20	.19	.165	.21	.24	.265	.22	.26	.29	.31	.34	.36
Flats, Above Ordinary	.22	.485	.29	.27	.22	.21	.185	.22	.25	.28	.255	.245	.275	.295	.33	.35
Ordinary without basement	....	....	.19	.17	.143	.14	.12	.15	.17	.19	.16	.17	.20	.22	.24	.25
MARKETS																
Ordinary without basement	....	....	....	....	....	....	....	....	....	....	....	.13	.145	.16	.18	.19
CHURCHES & THEATRES																
Fireproof	.18	.405	.36	.35	.27	.26	.225	.27	.31	.35	.38	.42	.50	.54	.56	.58
Ordinary	.155	.35	.275	.30	.305	.195	.185	.22	.25	.28	.31	.30	.35	.38	.43	.44
OFFICE BUILDINGS																
Fireproof	.305	.685	.52	.50	.39	.375	.325	.39	.445	.50	.55	.54	.59	.64	.67	.69
Ordinary	.32	.485	.335	.32	.25	.24	.215	.265	.30	.335	.36	.32	.375	.40	.435	.46
HOTELS																
Fireproof	.335	.755	.57	.36	.438	.42	.375	.45	.52	.58	.60	.59	.64	.69	.72	.74
Ordinary	.295	.665	.34	.31	.285	.24	.215	.265	.30	.34	.34	.32	.375	.40	.45	.475
SCHOOLS																
Fireproof	.32	.495	.435	.40	.32	.30	.27	.33	.35	.425	.465	.45	.50	.54	.56	.58
HOSPITALS																
Fireproof	.32	.72	.435	.45	.32	.32	.278	.335	.385	.43	.50	.60	.66	.715	.725	.745
ALL STEEL BUILDINGS																
Under 20,000 cf	.12	.25	.14	.13	.11	.11	.10	.12	.14	.16	.17	.14	.15	.16	.165	.175
20,000 to 100,000 cf	.08	.18	.12	.105	.10	.10	.09	.105	.13	.13	.14	.12	.14	.155	.16	.17
Over 100,000 cf	.065	.14	.10	.09	.07	.07	.065	.075	.085	.095	.10	.10	.115	.125	.13	.14
APARTMENTS																
Fireproof	.35	.78	.525	.50	.30	.375	.34	.41	.47	.52	.56	.55	.595	.64	.67	.695
Protected	.295	.665	.46	.45	.345	.34	.30	.36	.41	.46	.48	.455	.505	.55	.57	.59
Brick, ordinary	.28	.63	.32	.29	.24	.23	.22	.265	.30	.335	.44	.36	.41	.445	.47	.498
Brick, veneer	.24	.54	.30	.28	.225	.22	.21	.255	.28	.31	.31	.355	.31	.34	.365	.38
RESIDENCES																
Brick, 12" basement wall	.305	.685	.46	.445	.345	.335	.355	.31	.34	.38	.36	.33	.36	.40	.455	.46
Brick, 1-Story, 8" bsmt wall, not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.36
Brick, Veneer or Stucco	.24	.54	.325	.305	.24	.23	.225	.25	.27	.30	.30	.275	.315	.35	.37	.37
Brick, Veneer or Stucco, 1-Story	....	....	....	....	....	....	....	....	....	....	....	.235	.30	.33	.36	....
Brick, Veneer or Stucco, 1-Story not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.35
Frame	.215	.485	.365	.34	.30	.19	.19	.215	.23	.26	.24	.19	.25	.28	.31	.32
Frame, not over 25,000 cf	....	....	....	.20	.15	.15	.14	.17	.19	.21	.21	.18	.23	.24	.30	....
Frame, 1 to 1½ Stories, not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.31
Cinder concrete block	....	....	.30	.37	.29	.28	.225	.27	.31	.35	.35	.30	.34	.36	.42	.43
Cinder concrete block, 1-Story not over 18,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	.34
GARAGES																
Gas and Service Station	....	....	....	....	....	....	.315	.305	.30	.34	.36	.35	.425	.45	.48	.48
Fireproof	....	.30	.23	.23	.17	.17	.155	.18	.21	.235	.25	.25	.28	.30	.31	.32
Mill Construction	....	.20	.15	.135	.11	.11	.10	.12	.14	.16	.175	.15	.18	.19	.21	.22
Ordinary	....	.17	.135	.13	.10	.10	.09	.105	.12	.13	.14	.135	.15	.16	.17	.18
Frame	....	.14	.10	.09	.08	.07	.065	.08	.09	.10	.11	.085	.105	.11	.12	.125
SHEDS WITHOUT HEAT																
Enclosed, without floor, frame	....	....	....	....	.048	.045	.04	.05	.065	.06	.055	.05	.06	.065	.07	.075
Enclosed, frame	....	....	....	....	.06	.06	.05	.065	.07	.08	.08	.07	.08	.09	.10	.105
Enclosed, ordinary construction	....	....	....	....	.095	.093	.09	.105	.12	.13	.14	.10	.115	.125	.14	.15
Enclosed, without floor, ordinary construction	....	....	....	....	.093	.09	.08	.10	.115	.125	.13	.09	.10	.11	.12	.13
Enclosed, all steel	....	....	....	....	.045	.045	.04	.05	.055	.06	.07	.06	.07	.075	.08	.09
Enclosed, without floor, all steel	....	....	....	....	.035	.035	.033	.04	.045	.05	.06	.05	.06	.065	.07	.08
Open shelter, frame construction	....	....	....	....	.08	.08	.08	.035	.04	.05	.048	.045	.05	.055	.06	.07

Classification of Buildings	Jan 1 1945	Jan 1 1946	Jan 1 1947	Jan 1 1948	Jan 1 1949	Jan 1 1950	Jan 1 1951	Jan 1 1952	Jan 1 1953	Jan 1 1954	Jan 1 1955	Jan 1 1956	Jan 1 1957	Jan 1 1958	Jan 1 1959	Jan 1 1960
FACTORIES, & WAREHOUSES																
Fireproof, Under 300,000 cf	$0.345	$0.35	$0.415	$0.45	$0.49	$0.50	$0.53	$0.55	$0.59	$0.62	$0.64	$0.67	$0.70	$0.72	$0.75	$0.78
Fireproof, Over 300,000 cf	.31	.33	.38	.41	.45	.46	.485	.505	.545	.58	.60	.63	.66	.68	.71	.74
Mill Construction	.23	.24	.27	.31	.335	.325	.35	.36	.38	.40	.41	.43	.45	.46	.48	.50
Ordinary	.215	.22	.245	.28	.30	.295	.33	.33	.36	.36	.37	.39	.40	.41	.42	.43
Frame	.175	.18	.21	.24	.265	.26	.285	.305	.31	.31	.31	.32	.33	.33	.34	.35
STORES																
Fireproof	.59	.60	.675	.74	.80	.81	.85	.885	.95	1.01	1.04	1.09	1.14	1.17	.123	1.28
Ordinary	.39	.395	.44	.50	.54	.53	.57	.59	.63	.64	.65	.68	.72	.73	.75	.77
Flats, Above Ordinary	.38	.40	.455	.52	.56	.55	.60	.61	.64	.66	.67	.70	.74	.75	.77	.79
Ordinary without basement	.26	.305	.30	.34	.37	.365	.39	.40	.43	.44	.45	.47	.50	.51	.53	.54
MARKETS																
Ordinary without basement	.205	.21	.25	.28	.30	.295	.315	.325	.34	.36	.37	.39	.41	.42	.43	.44
CHURCHES & THEATRES																
Fireproof	.63	.645	.73	.75	.81	.82	.87	.908	.95	.99	1.02	1.06	1.11	1.13	1.17	1.21
Ordinary	.48	.49	.55	.60	.65	.64	.69	.71	.745	.76	.77	.80	.84	.85	.87	.89
OFFICE BUILDINGS																
Fireproof	.745	.75	.85	.95	1.02	1.04	1.10	1.145	1.22	1.27	1.31	1.36	1.43	1.46	1.51	1.57
Ordinary	.50	.52	.59	.67	.73	.71	.77	.80	.84	.85	.86	.89	.93	.94	.96	.98
HOTELS																
Fireproof	.80	.82	.92	.99	1.07	1.08	1.15	1.195	1.27	1.33	1.37	1.43	1.49	1.52	1.57	1.63
Ordinary	.518	.53	.585	.66	.71	.695	.75	.78	.83	.84	.85	.88	.92	.93	.96	.97
SCHOOLS																
Fireproof	.63	.645	.73	.83	.89	.90	.955	.99	1.05	1.09	1.13	1.16	1.23	1.25	1.30	1.35
HOSPITALS																
Fireproof	.805	.82	.885	.96	1.06	1.07	1.14	1.185	1.26	1.32	1.36	1.41	1.46	1.51	1.57	1.63
ALL STEEL BUILDINGS																
Under 20,000 cf	.19	.195	.22	.245	.265	.27	.30	.30	.32	.33	.34	.36	.38	.39	.40	.42
20,000 to 100,000 cf	.183	.19	.215	.24	.26	.265	.27	.28	.30	.31	.32	.34	.36	.37	.38	.40
Over 100,000 cf	.15	.16	.18	.20	.215	.22	.225	.245	.26	.27	.28	.30	.32	.33	.34	.35
APARTMENTS																
Fireproof	.75	.77	.87	.96	1.04	1.08	1.12	1.165	1.24	1.29	1.33	1.39	1.45	1.48	1.53	1.58
Protected	.64	.655	.70	.77	.84	.84	.90	.92	.97	1.00	1.03	1.06	1.11	1.13	1.16	1.20
Brick, ordinary	.54	.56	.63	.71	.77	.75	.81	.84	.88	.89	.90	.93	.97	.98	1.01	1.04
Brick, veneer	.41	.43	.48	.55	.595	.55	.63	.65	.68	.69	.70	.73	.77	.78	.80	.82
RESIDENCES																
Brick, 12" basement wall	.50	.52	.59	.67	.73	.71	.77	.79	.82	.84	.85	.88	.93	.93	.95	.98
Brick, 1-Story, 8" bsmt wall, not over 18,000 cf	.39	.40	.46	.52	.56	.55	.61	.625	.65	.66	.67	.70	.73	.74	.76	.78
Brick, Veneer or Stucco	.40	.42	.47	.53	.56	.55	.595	.615	.64	.66	.67	.70	.73	.74	.76	.78
Brick, Veneer or Stucco, 1-Story	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Brick, Veneer or Stucco, 1-Story not over 18,000 cf	.38	.39	.44	.50	.54	.53	.575	.595	.63	.64	.65	.67	.70	.71	.73	.75
Frame	.36	.37	.41	.47	.50	.485	.53	.54	.57	.58	.58	.60	.63	.63	.64	.66
Frame, not over 25,000 cf	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
Frame, 1 to 1½ Stories, not over 18,000 cf	.34	.36	.39	.45	.49	.475	.51	.53	.55	.56	.56	.58	.61	.61	.62	.64
Cinder concrete block	.46	.475	.51	.56	.63	.61	.66	.68	.71	.73	.74	.77	.81	.82	.84	.86
Cinder concrete block, 1-Story not over 18,000 cf	.37	.38	.42	.47	.53	.51	.56	.58	.60	.62	.63	.65	.68	.69	.71	.73
GARAGES																
Gas and Service Station	.50	.53	.65	.67	.72	.73	.78	.81	.86	.89	.91	.94	.99	1.01	1.04	1.07
Fireproof	.345	.35	.415	.45	.49	.49	.53	.54	.58	.62	.64	.67	.70	.73	.75	.78
Mill Construction	.24	.25	.27	.31	.34	.33	.35	.365	.38	.40	.41	.43	.45	.46	.48	.50
Ordinary	.195	.20	.22	.26	.28	.275	.30	.31	.33	.34	.35	.36	.38	.39	.40	.41
Frame	.14	.15	.17	.195	.21	.20	.22	.23	.24	.25	.26	.26	.28	.28	.29	.30
SHEDS WITHOUT HEAT																
Enclosed, without floor, frame	.08	.085	.10	.11	.12	.115	.125	.13	.14	.14	.14	.15	.16	.16	.16	.17
Enclosed, frame	.115	.12	.135	.145	.155	.15	.16	.168	.175	.18	.18	.19	.20	.20	.20	.21
Enclosed, ordinary construction	.16	.17	.19	.20	.215	.21	.22	.228	.24	.25	.25	.26	.28	.29	.30	.31
Enclosed, without floor, ordinary construction	.14	.15	.17	.185	.20	.19	.205	.21	.22	.23	.23	.24	.25	.26	.27	.28
Enclosed, all steel	.10	.105	.12	.13	.14	.145	.155	.16	.17	.18	.19	.20	.21	.22	.23	.24
Enclosed, without floor, all steel	.09	.10	.11	.12	.13	.135	.14	.145	.155	.16	.16	.17	.18	.19	.19	.20
Open shelter, frame construction	.08	.085	.10	.105	.11	.10	.11	.115	.12	.13	.12	.13	.14	.14	.14	.14

How to Measure Labor Productivity

By Irwin Bromberg

The first requirement for construction cost control is a continuous measure of unit costs, and this necessitates, as fast as costs are incurred, a measure of field productivity.

Field labor costs on plant construction and equipment erection are always the biggest question mark in cost estimating. But they also give the cost control engineer his most productive opportunities. The unit of measurement for field labor productivity is the number of man-hours per unit of work. How much this can vary and why will be discussed. But first the job must start with the base man-hour unit expenditure budgeted for each unit of work. By keeping close records of actual man-hours that have been expended, the productivity ratio can be computed.

For example, if the base erection unit is 10.0 man-hours per cu yd for a specific type of concrete work, a project expenditure of 12.0 man-hours per cu yd will give us a productivity factor of 83%.

Now invert this to get an inverse productivity factor of 1.20, and you can see at once that that job is overrunning estimates by 20%. This inverse productivity factor is equally useful in updating and preparing new estimates for other jobs.

Cost codes enable timekeepers on the job to obtain and classify properly both field man-hour and dollar expenditures. The field cost engineer records the quantities installed corresponding to the man-hour and dollar expense. This enables him to check actual man-hours against those budgeted and to calculate the inverse productivity factor. If unit costs are out of line he can alert the superintendent.

Some man-hour units vary with the progress of the job. For example, man-hours per ton of structural steel are low in the beginning when the heavy framing members are installed at grade. The lighter framing members which follow in higher elevations in the structure will cost more man-hours per ton. Allowance must be made for this variation in judging early job productivity for a given type of work.

When the job is complete the actual quantities may differ from those budgeted. Thus for a productivity calculation an adjusted base budget is needed where installed quantities are multiplied by the base man-hour units budgeted. These adjusted budget man-hours may now be compared to the actual man-hours experienced. Actual divided by base man-hours expended give the inverse productivity factor.

How this inverse productivity varies for different classes of work is illustrated by the accompanying analysis of a Gulf Coast refinery unit. Note that overall the inverse productivity was 1.07 whereas component classes of work ranged from a low of 0.91 to a high of 1.48.

For vacuum equipment and mechanical handling equipment erection, productivity factors are not significant because of the few hundred man-hours measured. Where a factor of 1.34 for erection of pumps and drives reflects local craft requirements, or the factor of 1.26 for elevated concrete structures results from adverse weather at the time of major pours, the record should note whether the situation is a recurring one, or peculiar to the project in hand.

When job records show significant and consistent results, these productivities may be used to adjust the base units for cost estimates of new projects in the same area. Adjustment of base units is the normal practice when better field procedures consistently improve productivities.

These are the main reasons why field productivity varies so much, in the order of their importance:

- **Availability of craftsmen**—When employment is high or the supply of craftsmen otherwise is limited in the specific area, a new project will suffer a poorer productivity. Craftsmen who would otherwise be classified in a lower grade are qualified as first class mechanics.

- **Weather**—Local temperatures, snow, rain, storms and wind will affect productivity. Man-hours for a "show up" time or other hours not worked do not show up in actual erection units. Unworked man-hours are treated as an overhead item, if paid for.

- **Local labor practice**—When erection of an item can be done by one of several crafts and both crafts insist upon jurisdiction, an inefficient situation may result. Limitation of production per man due to union regulation will also hurt productivity.

- **Supervision**—A tight supervisory organization with a cost conscious approach will assure best potential productivity. The schedule must be strictly adhered to and the cost engineer be on

Labor Productivity Calculation—on Gulf Coast Refinery Unit

Cost Code	Work Classification	Adjusted* Base Budget Man-hours	Actual Man-hours	Inverse Productivity Factor
01	Foundations	34,220	35,241	1.03
	Paving	7,182	7,469	1.04
02	Buildings	2,781	3,615	1.30
03	Stacks	2,725	3,300	1.21
04	Flues	1,028	1,059	1.03
06	Heaters	29,576	31,943	1.08
10	Structural Steel	9,238	10,901	1.18
12	Elev. Concrete Structures	7,154	9,014	1.26
20	Piping	48,867	52,783	1.08
23	Pipe Support Structures	1,260	1,143	0.91
45	Exchangers	1,302	1,339	1.03
46	Towers	2,149	2,276	1.06
	Trays and Packing	12,910	13,809	1.07
52	Tanks	2,415	2,607	1.08
54	Cooler Box and Coils	2,543	2,692	1.06
60	Vacuum Equipment	186	275	1.48
70	Pumps and Drives	4,729	6,334	1.34
76	Electricals	14,367	15,087	1.05
78	Instruments	9,613	10,192	1.06
87	Insulation (Sub-contract)	....	....	....
88	Fireproofing	12,541	11,539	0.92
91	Testing	3,589	3,874	1.08
95	Painting	12,197	11,468	0.94
98	Mech. Handling Equipment	175	240	1.37
	TOTAL	222,747	238,200	1.07

**Actual quantities multiplied by base erection man-hour units*

MR. BROMBERG is cost control manager of the Process Plants Division of Foster Wheeler Corp., New York City.

the job. Poor control will cause poor results.

- **Tools**—Sufficient tools in excellent working condition will assure optimum productivity.

- **Engineering and purchasing**—Delays in delivery of materials to the job or stretchout due to improper control of engineering and purchasing will have adverse effect upon productivity. The inclusion of extra work on the job at a "time" that does not correspond with the project schedule will also cause this type of delay. Layout of the project should be examined from the viewpoint of erection requirements so as to facilitate progress.

- **Base units**—If field procedures are improved so much that inverse productivity factors are consistently less than 1.00 in good labor areas, adjust the base erection man-hour unit downward.

While field labor management is a fertile field for good cost control, it is only part of the whole job. Control also of engineering, purchasing, supervision and tools will assure the best potential overall project control.

Needed: More Indexes To Measure Man-Hours

What construction needs, in addition to its general purpose cost indexes and a vast number and variety of special purpose cost indexes—all based on dollars—are indexes that measure the changes in man-hours required per unit, for various operations involving high man-hour expenditure.

That's the conclusion reached at a workshop on cost indexes that was conducted by the American Association of Cost Engineers at its Pittsburgh convention last year.

The most difficult of all cost estimating is that of getting accuracy into installation cost projections, notably of equipment, piping, concrete forms or wherever a large use of manpower is required.

Such man-hour cost indexes on a consistent continuing basis might lick the so far unsolved problem of measuring construction productivity. But they would have to be based on contractor's experience and accurate work-unit definition.

If such standard, frequently recurring, work units were adopted and contractors in various regions of the country could report man-hour per unit experience each quarter, a new cost estimating tool would be available for measuring trends in construction labor productivity and variations in it from one area to another.

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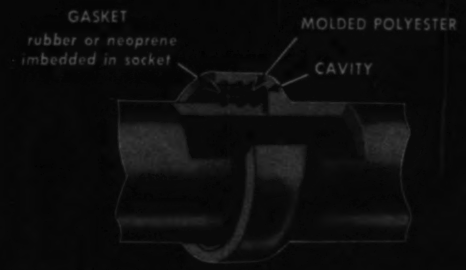

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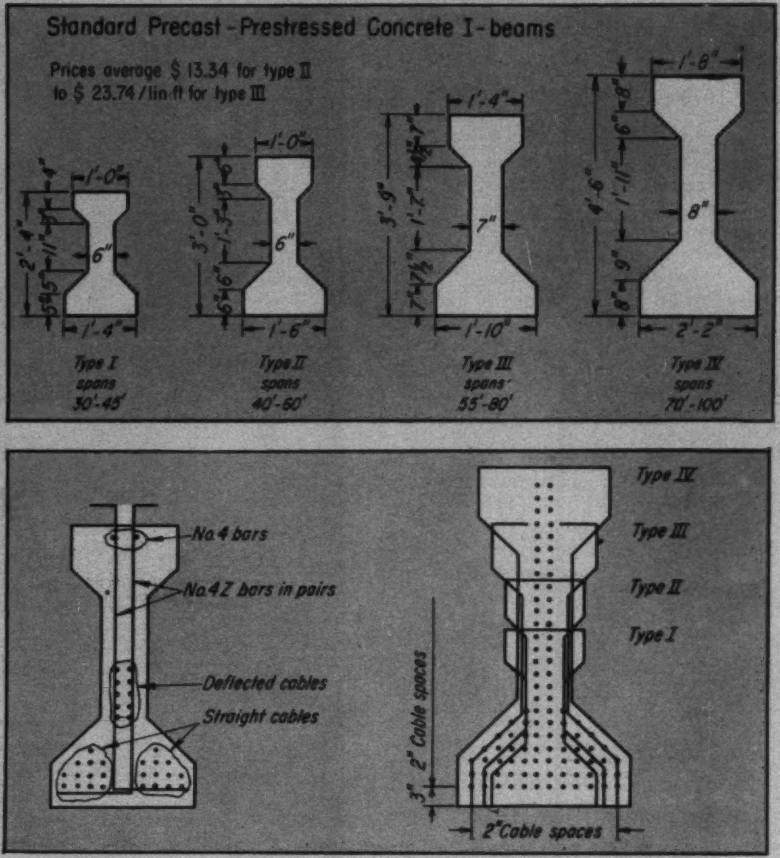

Standard Precast - Prestressed Concrete I - beams
Prices average $ 13.34 for type II
to $ 23.74 / lin ft for type III
1'-0"
2'-4"
11"
6"
1'-4"
Type I
spans
30'-45'
1'-0"
3'-0"
1'-3"
6"
1'-6"
Type II
spans
40'-60'
1'-4"
3'-9"
1'-7"
7"
1'-10"
Type III
spans
55'-80'
1'-8"
4'-6"
1'-11"
8"
9"
2'-2"
Type IV
spans
70'-100'
No 4 bars
No 4Z bars in pairs
Deflected cables
Straight cables
Type IV
Type III
Type II
Type I
2" Cable spaces
3"
2" Cable spaces

STANDARD AASHO-PCI sections are the base for prices reported below from Florida.

Repeated Casting Lowers Prices

Simplification and standardization of precast-prestressed concrete I-beams and mass production casting has added economies in America to the economy of large reduction of material that gave the original impetus to prestressing in Europe.

In 1954, when economical span limits were thought to be 60 ft, Florida's bridge engineer, W. E. Dean, started to standardize beams in three sizes. By 1959 precast-prestressed I and slab sections dominated members used in the simple structures that account for 75% of Florida's bridge work. Spans are from 30 to 110 ft but use is greatest in the 55- to 80-ft range.

This development and use of a limited number of simple standardized sections and the achievement of uniformity of practice has stimulated the growth of 14 plants to supply Florida's needs. This competition has produced the prices shown on the accompanying table, a range from $12 to $28 per lin ft of beam, but averages of $13.34 to $23.74 per lin ft for spans ranging from 40 to 100 ft.

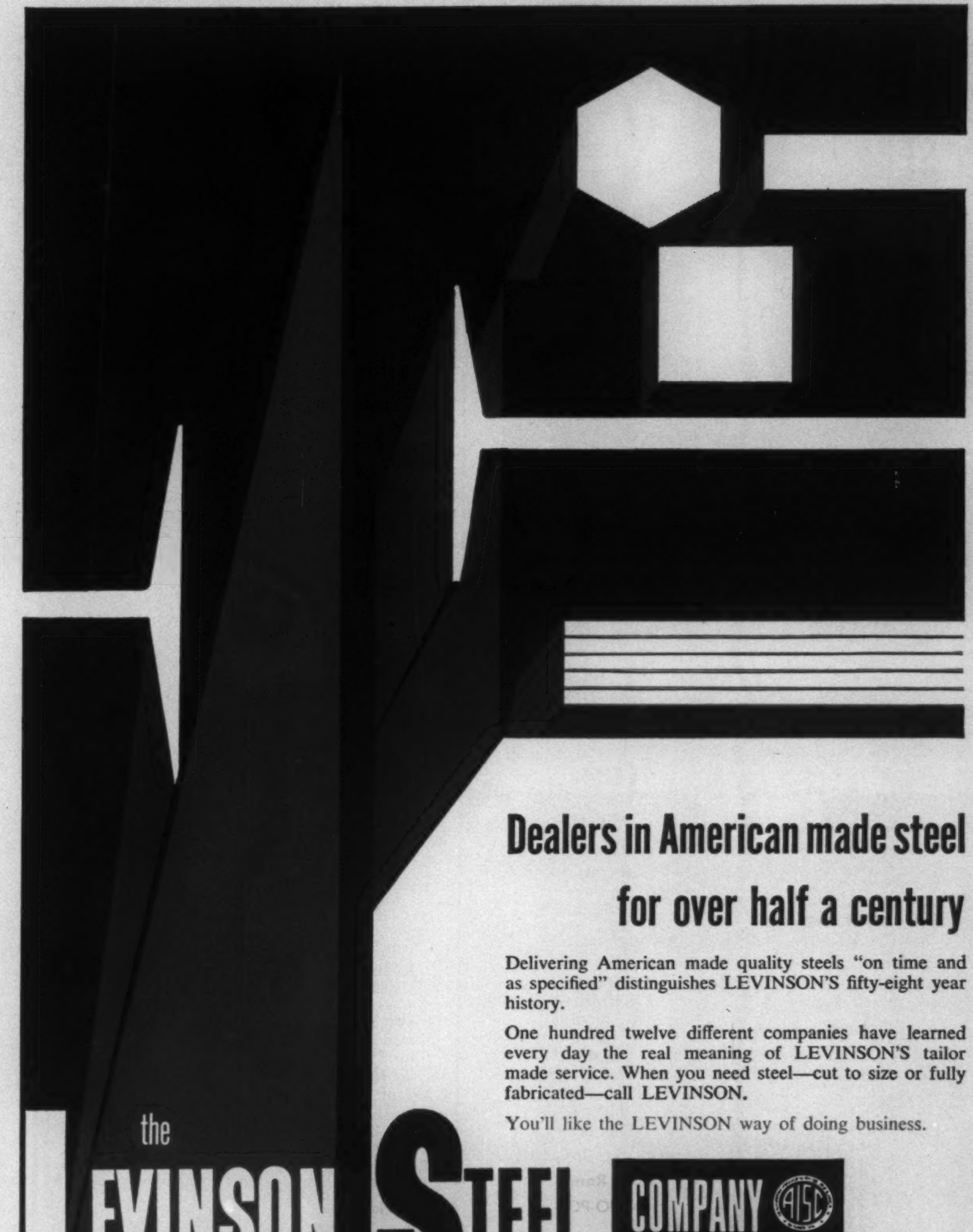
The new Portland Cement Association Bulletin R/C 34 gives tables and design data using 4 AASHO-PCI sections shown in the charts here, which illustrated the paper given by Mr. Dean at the Sixth Annual Mississippi Highway Conference at the University of Mississippi.

Price Range on Standard Precast-Prestressed Concrete I-beams

AASHO-PCI Standard Highway Bridge Beams in Florida

Type	Spans lin ft	Relative Use—lin ft	Price* per lin ft—1959 Min	Aver	Max
I	30-45	(no competitive advantage—superseded by standardized slab)			
II	40-60	113,262	$12	$13.34	$16
III	55-80	144,588	$14	$16.01	$18
IV	70-100	25,165	$22	$23.74	$28

* *Governed by quantity, job location*



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CIRCLE 113 ON READER SERVICE CARD

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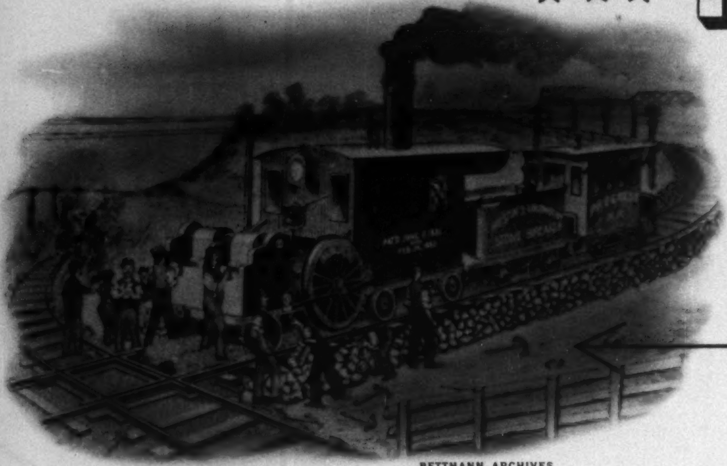

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They had plenty of ingenuity in the old days—what they lacked was sharp production tools! This 1893 Locomotive Ballast Crushing Machine could run at 30 miles per hour, and change to a stone breaker in 5 seconds by raising the drive wheels off the track. The two hand-fed crushers could turn out a total of 25 to 30 yards per hour.

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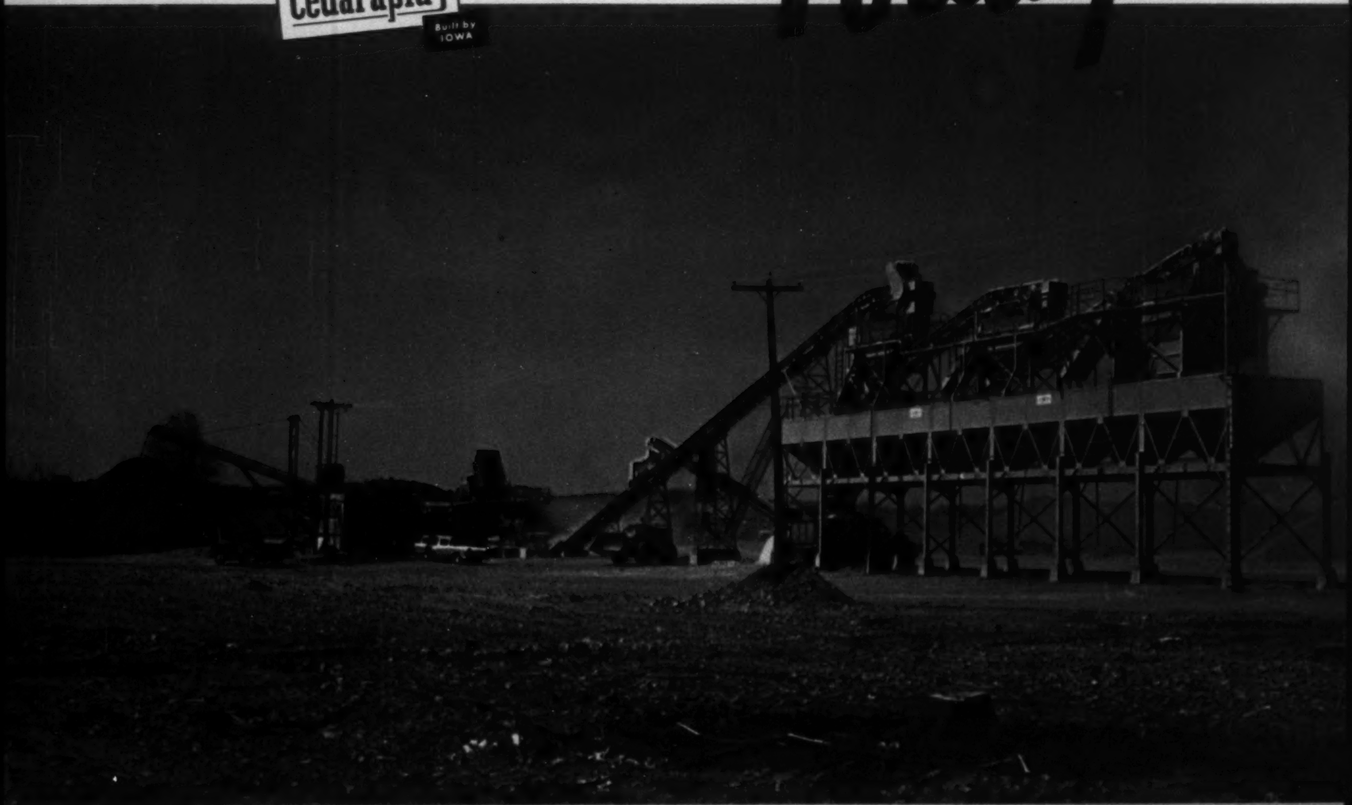

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It takes production units that will *meet the toughest specifications in roadbuilding history.* It takes portable plants, like the Commander above, to let you bid on the best jobs that may be hundreds of miles apart, and get you there fast—or stationary plants like the one at the left which are factory engineered by experts to handle your specific local job most productively. And to make money for you, this equipment *must produce at lowest cost per ton.*

Cedarapids equipment does! It gives you the capacity, the specification-meeting ability, and the operating economy you need to meet today's roadbuilding challenge with profit.

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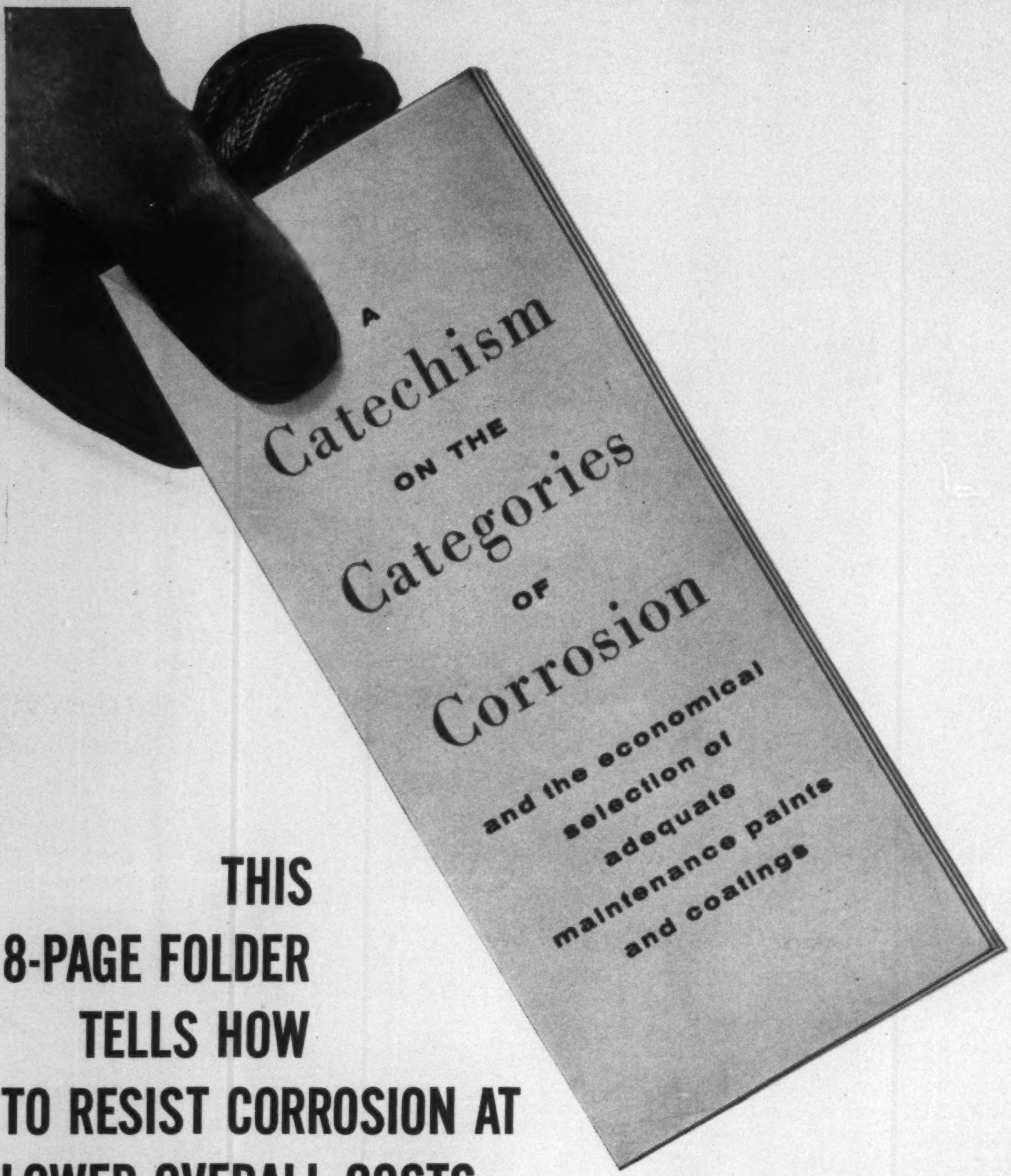
A
Catechism
ON THE
Categories
OF
Corrosion
and the economical selection of adequate maintenance paints and coatings

THIS 8-PAGE FOLDER TELLS HOW TO RESIST CORROSION AT LOWER OVERALL COSTS

If you have anything to do with maintenance of equipment or structure, or with the costs that result therefrom, this folder may be extremely useful to you. It gives a rational basis for paint and painting specifications, and tells how all surface and area exposures can be classified into the Four Categories of Corrosion.

As in all other phases of engineering, both underdesign and overdesign of maintenance painting carry economic penalties. Either one will show up sooner or later on the overall cost sheets. Although Hercules does not make any finished paints or coatings, we have had over twenty-five years' practical experience with Parlon® chlorinated rubber, a key material for corrosion-resistant and high-performance maintenance paints.

This booklet has been written with this background of experience. Write for your copy.

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HERCULES POWDER COMPANY
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←CIRCLE 115 ON READER SERVICE CARD

CIRCLE 116 ON READER SERVICE CARD

Materials Prices

Monthly Market Quotations by ENR Field Reporters

LUMBER, TIMBER, PLYWOOD PER M FT.B.M., CARLOAD LOTS F.O.B.

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Atlanta........n†	**$92.00**	**$95.00**	**$90.00**	**$95.00**	**$95.00**	**$100.00**	**$130.00**	......	......	**$140.00**	**$160.00**	$135.00	$270.00
Baltimore.......o	**98.00**	**98.00**	**102.50**	**102.50**	**108.00**	**108.00**	**125.00**	......	......	**175.00**	**190.00**	175.00	275.00
	120.00g	*124.00g*	*125.00g*	*128.50g*	*128.50g*	*128.50g*	*150.00g*	*$180.00*	*$170.00*	......	......		
Birmingham....n†r	**83.00**	**85.00**	**82.00**	**84.00**	**89.00**	**95.00**	**111.00**	......	......	**115.00**	**168.00**	122.30	205.80
	80.00	*80.00*	*83.00*	*81.00*	*81.00*	*98.00*	*88.00*	*85.00*	*88.00*				
Boston..........ns	**108.00f**	**108.00f**	**113.00f**	**113.00f**	**113.00f**	**127.00a**	......	......	......	......	......		
	112.00	*112.00*	*124.00*	*124.00*	*125.00*	*129.00*	*154.00*	*156.00*	*172.00*	......	......	160.00c	285.00c
Chicago.........**	**118.00**	**121.00**	**115.00**	**129.00**	**137.00**	**138.00**	**133.00**	......	......	**161.00**	**161.00**	147.00	244.00
	124.00	*124.00*	*137.00*	*135.00*	*135.00*	*136.00*	*144.00*	*144.00*	*144.00*				
Cincinnati.......n*	**102.50**	**103.75**	**96.50**	**98.00**	**104.75**	**112.75**	**121.00**	......	......	**138.00**	**125.00**	94.00f	175.00f
	110.00	*113.00*	*110.00*	*112.00*	*113.75*	*129.50*	*145.25*	*145.25*	*145.25*	......	......		
Cleveland.......o**	**100.00**	**102.00**	**102.00**	**100.00**	**104.00**	**110.00**	......	......	......	......	......	125.00a	205.00
	......	......	*115.00*	*112.00*	*112.00*	*116.00*	*140.00*	*140.00*	*140.00*				
Dallas..........‡	**76.00k**	**85.00k**	**80.00k**	**80.00k**	**78.00k**	**78.00k**	**125.00**	......	......	**133.00**	**180.00**	112.50ac	260.00ac
Denver.........n*	*Not in stock*		*119.50*	*120.50*	*119.50*	*122.00*	*140.00*	*162.50*	*170.00*	......	......	148.50	240.50
Detroit.........‡	**138.00**	**140.50**	**140.00**	**136.00**	**143.50**	**143.50**	......	......	......	**161.80**	......	160.00gc	250.00gc
	139.25	*139.25*	*150.25*	*148.50*	*157.00*	*162.00*	*201.00*	*218.00*	*218.00*	......	......		
Kansas City....tn	**120.00**	**120.00**	**130.00**	**132.50**	**135.00**	**150.00**	......	......	......	......	......	150.00	215.00
	120.00	*120.00*	*130.00*	*132.50*	*135.00*	*140.00*	*165.00*	*225.00*	*225.00*	......	......		
Los Angeles.....zuu	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*100.00*	*138.00*	*145.00*	*145.00*	......	......	128.00	225.00
Minneapolis.....ev	*145.00*	*145.00*	*145.00*	*145.00*	*145.00*	*145.00*	*185.00*	*185.00*	*185.00*	......	......	200.00	320.00
Montreal.......*bp	**84.00a**	**90.00a**	**84.00c**	**84.00a**	**99.00a**	**125.00a**	......	......	......	**120.00**	**120.00**	119.25	225.95
	160.00	*160.00*	*160.00*	*160.00*	*160.00*	*160.00*	*170.00*	*170.00*	*170.00*	......	......		
New Orleans....†n	**89.00**	**89.00**	**96.00**	**95.00**	**95.00**	**98.00**	**128.00**	......	......	**160.00**	**155.00**	116.25	215.00
	113.50	*113.50*	*115.50*	*115.50*	*115.50*	*116.50*	*122.00*	*125.50*	*125.50*	......	......		
New York.......t	**116.00**	**118.00**	**128.00**	**128.00**	**128.00**	**130.00**	**250.00**	......	......	**250.00**	**250.00**	123.20a	307.00a
	......	......	*127.00*	*128.00*	*128.00*	*130.00*	*169.00*	*174.00*	*174.00*	......	......		
Philadelphia....nt	**110.00**	**112.00**	**112.00**	**110.00**	**112.00**	**110.00**	**135.00**	......	......	......	......	150.00h	280.00h
	......	......	*125.00*	*125.00*	*125.00*	*125.00*	*200.00*	*200.00*	......				
Pittsburgh.....st	**135.00**	**135.00**	**135.00**	**135.00**	**140.00**	**140.00**	**165.00**	......	......	**145.00**	**186.00**	225.00	295.00
	135.00	*115.00*	*145.00m*	*150.00*	*160.00*	*150.00*	*225.00*	*225.00*	*225.00*	......	......		
St. Louis.......lnt	**119.00**	**121.00**	**129.00d**	**129.00d**	**129.00e**	**130.00e**	......	......	......	......	......	160.00ackj	267.00ack
	......	......	*138.00*	*138.00e*	*138.00e*	*188.00e*	*194.00e*	*194.00e*	*194.00*	......	......		
San Francisco..nz	*88.00*	*88.00*	*90.00*	*90.00*	*90.00*	*90.00*	*106.00*	*128.00*	*130.00*	......	......	92.00h	170.00h
Seattle.........n†	*68.00*	*72.00*	*73.00*	*75.00*	*75.00*	*76.00*	*90.00*	*98.00*	*98.00*	......	......	105.00aeg	205.00aeg
Toronto.........*	**87.00a**	**90.00a**	**89.00a**	**85.00a**	**89.00**	**88.00a**	**105.00a**	......	......	**89.00a**	......	*256.00	305.50
	98.00	*99.00*	*108.00*	*105.00*	*108.00*	*108.00*	*135.00*	*153.00*	*153.00*	......	......		

† F.o.b. mill. * F.o.b. city, CL, out of yard. ** F.o.b. city, CL, direct mill shipment. ‡ Deliv. to contr. CL.

LUMBER: Bold Face Type, Southern Pine. Italics, Douglas Fir. *a Spruce. *b Federal tax exempt, add 6% mun. & prov. tax. *c 5M lots. *d 8, 10, & 12 ft. lengths. *e 8 to 16 ft. lengths. *f Hemlock *g No. 1 common. *j 8 ft. lengths. *k No. 3 common. *l Add 2% sales tax. *n Less 2% disc. 10 days. *o Less 2% disc. 10th. *p Less 1% disc. 10 days. *q fir: $80.25 in truck lots, fob job or CL, f.o.b. city. *r For f.o.b. city price add $8 for pine, $38 for fir eff. 1/1/58. *s and trucklots. *t trucklots del. *u Retail LCL yard. *v Retail LCL, del. *w add 6% mun. & Prov. tax. *x add 4% sales tax.

* PLYWOOD (Plyform, oiled and edge sealed): Douglas fir, 4' x 8' panels, 5-ply sanded 2 sides, carload lots, delivered per 1000 sq. ft. surface. Seattle base price, Interior, moisture resistant, 5/8", $151.00; 3/4", $171.00 Exterior, waterproof, 5/8", $155.00; 3/4", $175.00. *a Delivered. *c Truck lots. *d A-C exterior. *e LCL. *f less 1%, 5 days. *g less 2% for cash. *h less 2% disc, 10 days. *j add 2% sales tax.

GLASS, EXPLOSIVES, CHEMICALS, PILES, TIES

	WINDOW GLASS Discounts from jobbers list, Feb. 1, 1950a Single or Double Strength A quality	WINDOW GLASS B quality	EXPLOSIVES Per lb. 40% Ammonia Gelatin in 50 lb. cases delivered in 500 lb. lots
Atlanta................	78%	80%e	$0.2495
Baltimore..............	74%d	74%d	.2695
Birmingham.............	82%f	82%f	.2495
Boston.................	72+10%p	72+10%p	.2695
Chicago................	72%	72%	.2695
Cincinnati.............	74%	74%	.2495
Cleveland..............	74-2-10%	74-2-10%	.2495
Dallas.................	76%	76%	.2770
Denver.................	73.5%	73.5%	.2695
Detroit................	74-10-10%	74-10-10%	.2695
Kansas City............	76-10-10%	76-10-10%	.2695
Los Angeles............	$12.88/17.32h	$10.45/14.13h	.2695
Minneapolis............	71-10%	71-10%	.2695
Montreal...............	40-10-5%b	40-10-5%b	23.20h
New Orleans............	76%e	76%e	.2695
New York...............	79%l	79%l	.5030g
Philadelphia...........	78%	80%	.2695
Pittsburgh.............	72%	72%	.2495
St. Louis..............	72-10-10%mo	72-10-10%mo	.2695
San Francisco..........	60%	73%	.2695
Seattle................	$8.85/11.55hiq	$6.41/8.67hjp	.2695
Toronto................	$6.49/9.57h	$5.90/8.70h	

Price of 60% Ammonia Gelatin is $0.15 per lb. higher than 40% in U. S., $1.75 per 100 lbs. higher in Canada.

Glass: *a Jobbers' list price per box, 14 x 20, ss, $42.75 for A quality, $37.50 for B quality; 14 x 20, ds, $60.00 for A quality, $52.75 for B quality. *b sales tax extra. *c 77% for single strength. *d From 6/15/52 list. *e 77% for double strength. *f Single strength; double strength, 83%. *g From 8/1/58 list. *h ss/ds, 40-in. *i 20 boxes min. *j CL quantity. *k eff. 12/58. *l eff. 10/15/58. *m less 2% disc, 10 days. *n less 1% disc, 10 days. *o add 2% sales tax. *p less 1% for cash. *q less 2% for cash

Explosives: Cartridges of 1¼" diameter or over, in standard lengths. *g deliveries in certain areas must be by truck or by truck and boat, requiring extra charge. *h F.o.b. Beloeil (near Montreal), per 100 lb., lots under 2000#, wood cases, forcite, 40%. Forcite 60%, $24.30 In fiber cases: forcite 40%, $24.05; forcite 60%, $25.80.

40% Ammonia Gelatin price ranges in other than urban areas, per lb: (except Seismograph Grades)

	C/L 300,000 lb. lots	10,000 lb. lots	2,000 lb. lots	200 lb. lots
Group 1*..............	$0.2095	$0.2195	$0.2545	$0.2695
Group 2†..............	.2170	.2270	.2620	.2770

* All areas except those in Group 2 and N.J. cities of Bayone, Hoboken, Jersey City, No. Bergen, Union City and Weehawken † Florida counties of Manatee, Hardee, Highlands, Okeechobee, St. Lucieand south thereof; Idaho; Maine; Montana; New Mexico counties of Catron, Socorro, Lincoln, De Baca, Roosevelt and south thereof; Texas counties of Bailey, Lamb, Hale, Floyd, Motley, Cottle, Hardeman, Foard, Knox, Haskell, Jones, Taylor, Coleman, McCulloch, San Saba, Burnet, Williamson, Milan, Robertson, Leon, Houston, Angelina, Nacogdoches, Shelby and south thereof.

PILES

Prices per linear foot, fir and pine, rough peeled, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine under fifty feet based on freight from mid-South, over fifty feet, on freight from deep South.

Dimensions	Points	Length	By Rail Pine*§ R	By Rail Fir R
12" at butt..................	6-in.	30 to 39-ft.	$0.38a	....
12"—2-ft. from butt..........	6-in.	40 to 44-ft.	.83	....
12"—2-ft. from butt..........	6-in.	45 to 49-ft.	.88	....
12"—2-ft. from butt..........	6-in.	50 to 54-ft.	.92	....
12"—2-ft. from butt..........	6-in.	55 to 59-ft.	.97	....
14"—2-ft. from butt..........	6-in.	60 to 64-ft.	1.04	....
14"—2-ft. from butt..........	6-in.	65 to 69-ft.	1.10	....
14"—2-ft. from butt..........	6-in.	70 to 74-ft.	1.22	1.28
14"—2-ft. from butt..........	6-in.	75 to 79-ft.	1.28	1.28
14"—2-ft. from butt..........	5-in.	80 to 84-ft.	1.40	1.32
14"—2-ft. from butt..........	5-in.	85 to 89-ft.	1.52	1.40

* Pine piling over 90 feet available only in limited quantities. § ASTM Class B

* a, trucked in from N. J.

RAILWAY TIES

Prices f.o.b. per tie box carload lots:

		6" x 8" x 8' Untr.	6" x 8" x 8' Tr.	7" x 8" x 8'6" Untr.	7" x 8" x 8'6" Tr.
Birmingham*...	Hardwood, Grade 3.....	$1.70	$2.55	Gr. 5 $2.25	$3.33
	Grade 2.....	1.50	2.35	" 4 2.10	3.18
	Grade 1.....	1.15	2.00	" 3a 1.70	2.78
Chicago........	Red Oak...............	2.85–3.00	4.00a–4.10	3.90	4.75–5.60
New York......	Mixed Hardwood.......	3.25	4.75	4.00	6.00
	Mixed Oak............	3.25	4.75	4.00	6.00
Philadelphia....	Mixed Oak............	2.38	3.87	2.78	4.57
St. Louis.......	Mixed Oak............	2.65	3.75a	3.10h	4.20ah
San Francisco..	Douglas Fir...........	2.24ef	3.68ef	2.72ef	4.00ca

Tr.—Treated; Untr.—Untreated. aCreosoted. c Empty cell. e Green f.o.b. cars. g 7 x 9 x 8'6" * Add 75¢/tie freight charge to Birmingham. *h 7" x 9" x 8½'

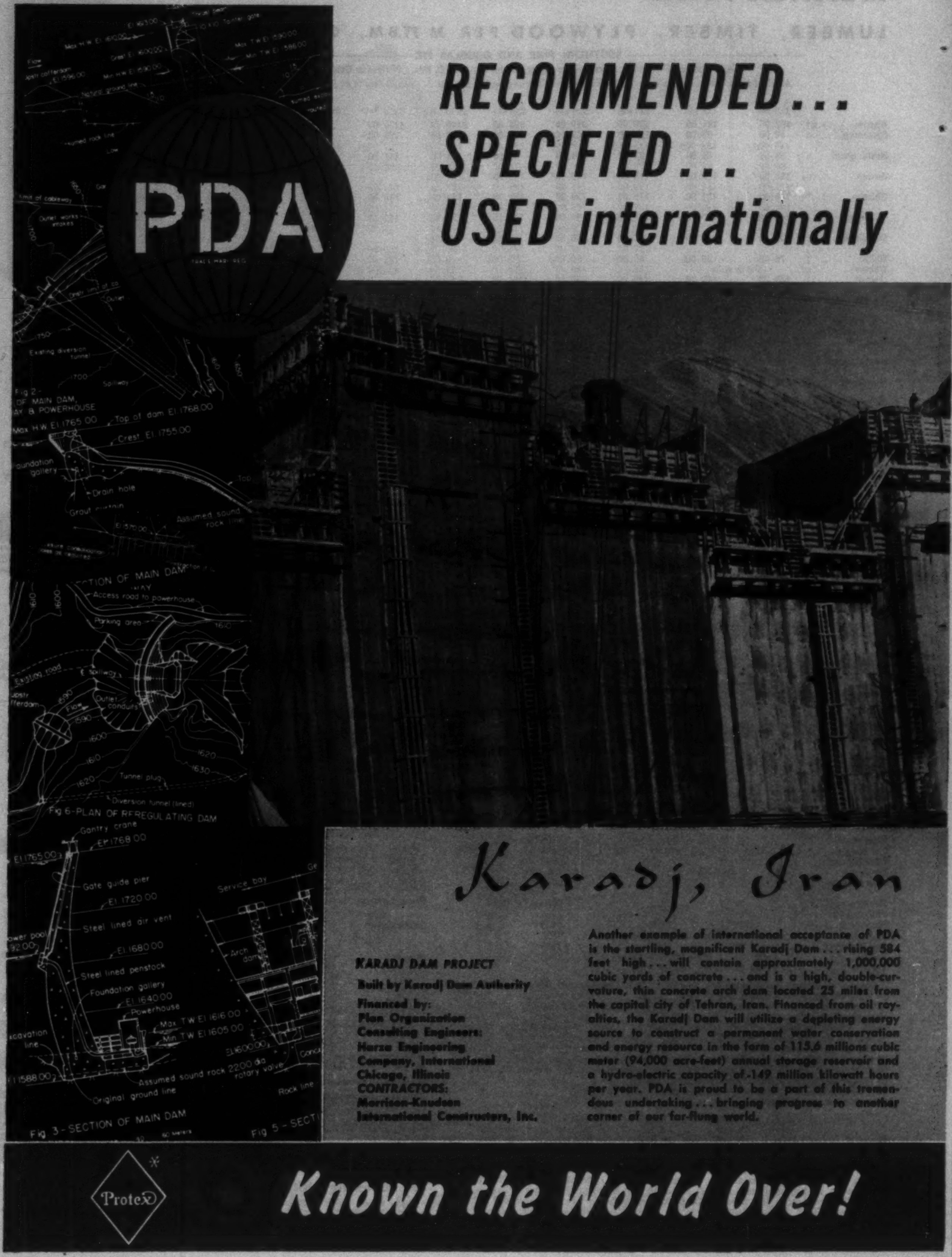
CHEMICALS

Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder in drums f.o.b. works, per 100 lb..........................	$5.02
Chlorine cylinders, liquid, per lb. f.o.b. works..............................	.11
Calcium chloride, 77–80%, flaked, 100-lb. paper bag, f.o.b. works, ton...........	31.00
Silicate of soda, 52 deg., in drums, f.o.b. works, per 100 lb..................	2.65
Soda ash, 58%, in paper bags, per 100 lb. dense............................	1.90
Sulphate of aluminum, commercial, in 100-lb. bags f.o.b. works..............	3.05
Sulphate of copper, in bags, 99% per 100 lb. f.o.b. works....................	21.20

See following ENR issues for OTHER PRICES:

- Wage Rates, Building Board, Lath, Insulation: Last, Mar. 3; Next, Mar. 31.
- Cement Aggregate, Ready-mixed Concrete, Asphalt: Last, Mar. 10; Next, Apr. 7.
- Iron & Steel Products, Pipe: Last, Mar. 17; Next, Apr. 14.
- Clay Products, Lime, Plaster, Paint, Roofing: Last, Feb. 25; Next, Mar. 31.


PDA
Fig 2 - OF MAIN DAM, AY & POWERHOUSE
Max H.W. El. 1765.00
Top of dam El. 1768.00
Crest El. 1755.00
Foundation gallery
Drain hole
Grout curtain
Assumed sound rock line
SECTION OF MAIN DAM
Access road to powerhouse
Parking area
Existing road
Spillway
Outlet conduits
Tunnel plug
Diversion tunnel (lined)
Fig 6 - PLAN OF REREGULATING DAM
Gantry crane
Gate guide pier
Steel lined air vent
Steel lined penstock
Foundation gallery
Powerhouse
Assumed sound rock
Original ground line
Fig 3 - SECTION OF MAIN DAM
Service bay
Arch dam
Rock line
Fig 5 - SECTI
Protex

RECOMMENDED... SPECIFIED... USED internationally

Karadj, Iran

KARADJ DAM PROJECT

Built by Karadj Dam Authority

Financed by:
Plan Organization
Consulting Engineers:
Harza Engineering
Company, International
Chicago, Illinois
CONTRACTORS:
Morrison-Knudsen
International Constructors, Inc.

Another example of international acceptance of PDA is the startling, magnificent Karadj Dam . . . rising 584 feet high . . . will contain approximately 1,000,000 cubic yards of concrete . . . and is a high, double-curvature, thin concrete arch dam located 25 miles from the capital city of Tehran, Iran. Financed from oil royalties, the Karadj Dam will utilize a depleting energy source to construct a permanent water conservation and energy resource in the form of 115.6 millions cubic meter (94,000 acre-feet) annual storage reservoir and a hydro-electric capacity of 149 million kilowatt hours per year. PDA is proud to be a part of this tremendous undertaking . . . bringing progress to another corner of our far-flung world.

Known the World Over!

from the makers of Protex, this field proven product has achieved world-wide acclaim in a matter of a few years . . . PDA! A water-reducing cement-dispersing agent, PDA is recommended, specified *and* used where-ever the efficient and economical placement of concrete is important!

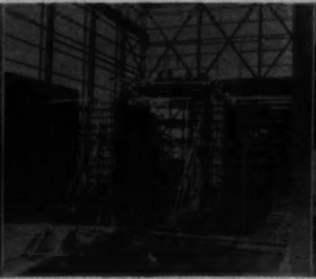
for Economical Concrete Placement!

Protex Dispersing Agent

PDA increases strength at any age through water reduction and cement dispersion . . . improving all the desirable characteristics of concrete, giving a "live" concrete with protection against "hot weather" slump loss and segregation. PDA allows the placing of controlled durable air entrained concrete without plastic shrinkage cracks. PDA is a selective initial retarder . . . retarding *only* the initial set of concrete for extended vibration and finishing time (not delaying form stripping time) YET it gives no retardation in winter concreting. THUS . . . year-round benefits are obtained and profitably used with "all season" PDA . . . from the makers of world famous PROTEX.

Wherever concrete is placed
more and more dollar-wise companies
are using the proven benefits of **PDA**

CANADA . . . here is a portion of the fabulous new Montreal-Laurentian Toll Road . . . another example of international acceptance of PDA. (Cartier Const. Co., St-Elzear, Quebec, Canada)



HALLAM, NEBRASKA . . . keeping pace with the demanding requirements of the nuclear age, PDA is being used at this Nuclear Power Facility . . . another example of the modern benefits of PDA. (Korshoj Construction Co. Inc., Blair Nebraska)

WASHINGTON, D. C. . . . gracefully rising over the Potomac is the Woodrow Wilson Memorial Bridge . . . another example of the increasing usage of PDA. (Arundel Corp., General Contractor, Virginia Concrete Co., Concrete Supplier and sponsored by the U. S. Bureau of Public Roads.)

ALCOVA, WYOMING . . . in the ever-expanding development of various reclamation projects around the country . . . PDA is being recommended, specified and used . . . another example of the growing recognition of PDA. (Coker-Kiewit & Cunningham, contractors, Casper, Wyoming and sponsored by the Bureau of Reclamation)

PROVEN in the field . . . PDA insures the successful and economical placement of better quality concrete! **DEPENDABLE** . . . YES! Proof positive from Government and private projects. Also backed by world-known and world-respected PROTEX name! **ADAPTABLE** to any need . . . PDA improves any Pre-stressed, Slip-form, Light-weight, Tunnel-lining, Tilt-up or Lift-slab concrete project! PDA's basic material is purified and desugared having been field tested and proven over past years giving you all the well known benefits . . . greatest water reduction . . . cement dispersion . . . maximum workability and durability . . . plus PROTEX economy and reliability.

For better and more economical
placement of concrete — specify
and use PDA . . . from the makers of Protex

AUTOLENE LUBRICANTS CO.
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SEND TODAY FOR MORE COMPLETE
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Please send new, informative FREE booklet outlining the proven benefits of PDA . . . "PDA — Protex Dispersing Agent"

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ATTENTION OF:________________

ADDRESS________________

CITY__________ STATE__________

T.M. REG.*

CIRCLE 119 ON READER SERVICE CARD

Better Buildings Go Up Faster

. . . as costs go down with Sheffield Joists

That's why you see more and more Sheffield Open-Web Joist construction everywhere. This joist is the ideal structural for light to medium occupancy buildings. A fast way to build, and the most economical.

The high strength-to-weight ratio of Sheffield Joists makes possible lighter framing and footings, and more column free space. The open-web design allows fast placement of pipes, conduits and ducts. The need for slow, expensive falsework is eliminated. Structures get under cover faster, with less chance of weather delays.

Speed. Strength. Lower costs. You get them all with Sheffield joist construction. For the whole story, get in touch with your nearest Sheffield office.

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SJI
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NEW JOIST BOOK

Gives complete data and SJI load tables for Sheffield Joists, plus the latest revision of the Standard Specifications of the Steel Joist Institute.

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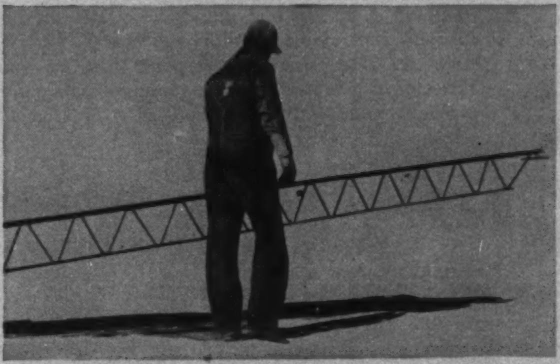
SHEFFIELD Open-Web Steel Joists

New steels are born at Armco

Sheffield Open-Web Steel Joists are delivered to the job fully fabricated and tagged—ready for immediate placing.



Light weight of Sheffield Joists makes them easy to handle. High strength-to-weight ratio makes possible big savings in construction costs and time.

Quickly installed, Sheffield Joists furnish a working platform right away. No temporary framework necessary. Other building trades proceed without delay.

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CIRCLE 120 ON READER SERVICE CARD

1st Quarterly Cost Roundup

Where the Building Dollar Goes

Unit and Ratio Costs Supplied through the Courtesy of Hudson Bros., Worthington, Minn.; Aberthaw Construction Co., Boston, Mass.; Miller-Davis Co., Kalamazoo, Mich.; Rommel-McFerran Co., Louisville, Ky.; Thatcher Construction Co., Inc., New York City

TYPE OF: Building	Bank	Office Building	Off & Warehouse	Off & Factory	Laboratory	Research
Construction: frame	Steel	Struct steel, cellularsteelfloor	Struct Steel	Steel	Concrete	Steel
outside walls	Masonry	Alum window wall	Brick, block	Brick & block	Masonry, block	Brick
Date construction started	Apr. 18, 1959	Aug. 1958	Aug. 1959	Oct. 1959	July, 1958	1958
Location	Worthington, Minn.	N. Y. International Airport	Queens, N.Y.C.	Kalamazoo, Mich.	Louisville, Ky.	Vicinity of Boston, Mass.
SIZE OF BLDG:						
Height, stories	1 & basement	3, basement & penthouse	1 & mezzanine	1 & mezzanine	3	1 (18 ft)
Floor area, sq ft	4,972 sf	26,436 sf	82,606 sf	26,385 sf	38,000 sf	123,962 sf
Volume, cu ft	129,272 cf	299,163 cf	1,494,855 cf	439,400 cf	456,000 cf	2,232,000 cf
RANGE OF COST of this type of	Avg.	Actual		Actual		Min. Avg. Max.
Building: $ per sq ft	$30.00	$26.61	$9.30	$8.76		$10.00 $12.65 $15.00
$ per cu ft	1.37	2.35	0.513	0.526		0.58 0.72 0.86
% Air conditioned	100%	75%	10%	10%	100%	Above costs dependent on interior refinements
Engineering News-Record Index (1913=100)	543	526	554	555	524	525

PRINCIPAL ITEMS OF COST — $ and % of Total Cost

PRINCIPAL ITEMS OF COST	Bank $	Bank %	Office Building $	%*	%**	Off & Warehouse $	%*	%**	Off & Factory $	%	Laboratory %	Research $	%	%**
Excavation & site improvements	3,425	2.46	17,700	2.52	2.30	51,146	6.73	6.66	10,128	4.38	3.0	132,324	8.96	8.36
Foundations	9,076	6.52	28,000	4.00	3.64	83,626d	11.00	10.90	6,023	2.61	12.1 p	64,980	4.39	4.10
Structural frame	10,150	7.29	35,000	4.96	4.56	116,110 e	15.27	15.16	33,029	14.29	3.2	61,590	4.17	3.89
Cellular steel flooring	....	.....	26,000	3.70	3.38	....	.....	.....	....	.....	.....	....	.....	.....
Cement finish work	8,234	5.91	16,400	2.33	2.13	76,985	10.13	10.03	15,431	6.67	1.5	16,178	1.10	1.03
Exterior masonry	8,063	5.78	25,000	3.55	3.25	52,000	6.84	6.77	20,873	9.03	3.1	82,653	5.60	5.22
5" concrete slab on grade	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	51,794	3.51	3.27
Metal wall panels	1,400	1.01	52,000 a	7.40	6.76	....	.....	.....	2,734	1.18	1.8	1,662	0.11	0.10
Interior partitions	1,800	1.29	14,000	2.00	1.82	4,710	0.62	0.61	14,700	6.36	.....	128,203 m	8.68	8.10
Metal office partitions	....	.....	9,500	1.35	1.24	....	.....	.....	....	.....	.....	....	.....	.....
Carpentry & millwork	8,927	6.41	18,500	2.63	2.41	9,470 f	1.26	1.23	9,876	4.27	2.9	17,356	1.18	1.10
Sash & glazing	6,730	4.83	6,600	0.94	0.86	10,332	1.36	1.35	5,294	2.29	4.4	21,721	1.47	1.37
Doors	1,400	1.01	....	.....	.....	14,250 g	1.88	1.85	7,465	3.23	1.0	16,721	1.13	1.06
Gypsum roof & insulation	....	.....	....	.....	.....	38,000	4.99	4.96	....	.....	.....	....	.....	.....
Roofing	3,516	2.52	8,600	1.22	1.12	30,000 j	3.95	3.90	9,296 j	4.02	2.6 j	42,211	2.86	2.67
Insulation	1,100	0.79	In roofing			In roofing			1,780	0.77	0.5	In roofing		
Metal roof deck	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	38,386	2.46	2.30
Waterproofing & dampproofing	1,280	0.92	3,500	0.50	0.45	1,095	0.14	0.14	....	.....	0.3	....	.....	.....
Metal lath, furring & plaster	3,167	2.27	12,800	1.82	1.64	16,070	2.11	2.09	1,872	0.81	3.8	3,726	0.25	0.24
Hollow metal work	1,048	0.75	17,800 b	2.53	2.32	In doors			1,708	0.74	0.4	5,747	0.39	0.36
Misc. iron & ornamental metal	....	.....	14,600	2.10	1.90	9,545	1.25	1.24	2,791	1.21	2.2	9,930	0.67	0.63
Tile, terrazzo & marble	4,318	3.10	4,100	0.58	0.53	1,600	0.21	0.20	2,052	0.89	1.8	10,292	0.70	0.65
Floor covering	3,744	2.69	4,200	0.60	0.55	2,600	0.34	0.34	4,919	2.13	1.6	20,108	1.36	1.27
Painting	2,925	2.10	9,500	1.35	1.24	3,800	0.50	0.50	7,123	3.08	1.3	9,474	0.64	0.60
Finish hardware	1,500	1.08	3,300	0.47	0.43	2,500	0.33	0.32	2,414	1.04	1.5	In doors		
Acoustical ceilings	7,590	5.45	14,000	2.00	1.82	....	.....	.....	3,174	1.37	1.2	41,860	2.83	2.65
Plumbing	27,945	20.06	39,900 c	5.63	5.19	28,435 c	3.74	3.70	22,454	9.71	In heating, etc.	99,523	6.74	6.28
Htg, ventil & air conditioning	In plumbing		145,000	20.60	18.89	67,200	8.84	8.75	24,989	10.81	23.5	231,751	15.69	14.63
Elec work & light fixtures	15,950	11.45	99,000	14.05	12.87	47,500	6.25	6.19	21,066	9.11	12.8	220,887	14.96	13.95
Elevators	....	.....	15,700	2.24	2.04	....	.....	.....	....	.....	4.8	....	.....	.....
Power plant	....	.....	....	.....	.....	....	.....	.....	....	.....	In heating, etc.	....	.....	.....
Intercom systems & TV	1,340	0.96	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	.....
Sprinklers	....	.....	....	.....	.....	41,600 n	5.47	5.42	....	.....	.....	62,975	4.26	3.98
Lab equipment	....	.....	....	.....	.....	....	.....	.....	....	.....	5.2	....	.....	.....
Unit kitchen	741	0.53	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	.....
Cash lift	3,259	2.34	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	.....
Truck docks	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	2,419	0.16	0.15
Incinerator, vault partitions & miscellaneous	672	0.48	....	.....	.....	....	.....	.....	....	.....	.....	....	.....	.....
General conditions	....	.....	63,000	8.93	8.19	51,627	6.79	6.73	....	.....	3.5 k	84,528	5.73	5.34
Total, exclusive of outside work & special	$139,300	100%	$703,700	100%		$760,201	100%		$231,200	100%	100%	$1,477,008 x	100%	
Wire fence	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	7,485	.....	0.47
Landscaping	....	.....	8,500	.....	1.10	....	.....	.....	....	.....	.....	8,740	.....	0.53
Paving, roads & parking fields	....	.....	30,000	.....	3.90	7,400	.....	0.96	....	.....	.....	....	.....	.....
Outside utilities	....	.....	14,236	.....	1.85	....	.....	.....	....	.....	.....	....	.....	.....
Sanitary line	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	12,959	.....	0.82
Water main	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	16,648	.....	1.05
Concrete reservoir	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	53,699	.....	3.39
Exterior platform (4,800 sf)	....	.....	....	.....	.....	....	.....	.....	....	.....	.....	7,069	.....	0.45
Special-bond premium & special insurance	....	.....	12,445	.....	1.62	....	.....	.....	....	.....	.....	....	.....	.....
Total	$139,300	.....	$768,881	.....	100%	$767,601	.....	100%	$231,200	100%	100%	$1,583,608 x	.....	100%

* Excl of outside work & special ** Incl outside work & special x These costs do not include general contractor's profit nor overhead

a Insulated b Hollow metal & convector enclosures c Incl toilet partitions d Wood piles $24,226; concrete piers $59,400 e Stl from warehouse, stock due to strike
f Incl overhead doors g Hollow metal, rolling steel j Incl sheet metal k Incl bond m Movable $81,216; masonry $46,987 n 100% p Includes a.ll concrete work

Where the Building Dollar Goes —continued from p. 121

Unit and Ratio Costs Supplied through the Courtesy of Hudson Bros., Worthington, Minn.; Stephen Gross & Sons, Inc., Hamilton, Ohio; Rommel-McFerran Co., Louisville, Ky.; Miller-Davis Co., Kalamazoo, Mich.; Thompson-Polizzi Construction Co., Coral Gables, Fla.; M. W. Watson, Inc., Topeka, Kan.; Ekdahl, Davis & Depew, Topeka, Kan.

TYPE OF: Building	Museum	Motel	Apartment	Hospital	Hospital Addition	School	Church
Construction: frame	Reinf. Concrete	Frame	Wood	Steel	Wall Bearing	Wall Bearing	Laminated Wood Arches
outside walls	Block & window walls	Brick veneer	Brick & Block	Brick	Masonry	Masonry	Brick
Date construction started	Nov. 1959	Aug. 1959	Aug. 1959	July 8, 1959	Aug. 1959	June 1959	Nov. 1959
Location	Miami, Fla.	Louisville, Ky.	Kalamazoo, Mich.	Adrian, Minn.	Oxford, Ohio	Cincinnati, Ohio	Topeka, Kan.
SIZE OF BUILDING:							
Height, stories	1	1	3	1	2nd floor addition	1	1
Floor area, sq ft	19,000 sf	35,000 sf	20,825 sf	10,272 sf	17,000 sf	30,000 sf	19,500 sf
Volume, cu ft	266,000 cf	315,000 cf	208,900 cf	147,468 cf	170,000 cf	320,000 cf	
RANGE OF COST of this type of building							
$ per sq ft	$14.11		$11.03	Avg. $18.78		$16.10	$22.14
$ per cu ft	$ 1.01		$ 1.10	1.47		$ 1.51	
$ per unit of capacity				$11,000/bed			$4,317/person
Capacity		100 bedrooms	24 units				1,000 persons
% Air conditioned	100%	100%	80%	0%	100%		
Engineering News-Record Index (1913=100)	554	554	554	552	554	548	554

PRINCIPAL ITEMS OF COST — $ and % of Total Cost	Museum		Motel	Apartment		Hospital		Hospital Addition		School			Church	
	$	%	%	$	%	$	%	$	%	$	%*	%†	$	%
Excavation & site improvements	1,000	0.38	5.9	9,083	3.96	1,706	0.94	850	0.96	5,500	1.18	1.14	11,300	2.62
Foundations	4,000	1.49	8.9	4,041	1.76	10,969	6.01	3,300	3.76	15,000	3.23	3.11	39,600	9.17
Structural frame	67,000	25.00	.....	20,223	8.81	3,100	1.70	1,500	1.71	18,000	3.87	3.73	40,000	9.27
Gypsum roof deck	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,000	2.37	2.28	.....	.....
Cement finish work	400	0.15	2.0	6,544	2.85	4,492	2.46	1,000	1.14	55,000	11.83	11.39	9,400	2.18
Exterior masonry	4,000	1.49	9.4	16,941	7.38	11,845	6.49	7,200	8.20	78,000	16.78	16.15	64,000	14.82
Interior partitions	4,300	1.60	.....	21,739	9.47	4,342	2.37	3,200	3.64	In masonry				
Carpentry & millwork	15,000	5.60	11.8	29,846	13.00	24,273	13.31	5,355	6.10	45,000	9.68	9.32	37,203	8.62
Sash & glazing	12,000	4.48	1.7	5,884	2.56	392	0.21	2,400	2.73	15,700	3.38	3.23	.....	.....
Doors	.....	.....	In millwork	6,742	2.94	1,800	0.99	In millwork		3,500	0.75	0.72	.....	.....
Roofing	12,000	4.48	2.8 a	2,234 a	0.97	6,241	3.42	1,500	1.71	11,000	2.37	2.28	30,000	6.95
Insulation	.....	.....	0.8	1,467	0.64	2,042	1.12	200	0.23	.....	.....	.....	.....	.....
Waterproofing & dampproofing	500	0.19	.....	236	0.10	482	0.26	200	0.23	350	0.08	0.07	.....	.....
Metal lath, furring & plastering	11,000	4.10	6.3	1,387	0.60	9,476	5.19	1,000	1.14	.....	.....	.....	17,000	3.94
Hollow metal work	.....	.....	2.0	1,890	0.82	3,462	1.90	550	0.63	3,500	0.75	0.72	16,000	3.71
Miscellaneous iron & ornamental metal	6,000	2.24	0.7	2,336	1.02	.....	.....	500	0.57	9,500	2.04	1.97	24,000	5.56
Tile, terrazzo & marble	13,000	4.85	4.2	650	0.30	1,318	0.72	5,000	5.69	2,117	0.45	0.44	5,100	1.18
Floor covering	1,400	0.52	0.3	4,215	1.84	4,767	2.61	2,100	2.39	7,000	1.51	1.45	.....	.....
Painting	4,000	1.49	1.8	10,203	4.44	3,184	1.75	1,750	1.99	12,500	2.69	2.59	14,000	3.24
Finish hardware	2,400	0.90	0.5	1,182	0.51	5,250	2.88	1,500	1.71	7,000	1.51	1.45	5,925	1.37
Acoustical ceilings	12,000	4.48	1.5	.....	.....	1,655	0.91	2,200	2.51	11,500	2.47	2.38	8,000	1.85
Plumbing	14,000	5.22	In htg, etc.	16,652	7.25	57,940	31.76	6,000	6.83	47,202	10.15	9.77	61,940 b	14.35
Heating, ventilating & air conditioning	55,000	20.52	28.4	34,505	15.07	In plumbing		8,500	9.68	61,121	13.15	12.65	In plumbing	
Electrical work & lighting fixtures	29,000	10.82	9.4	15,692	6.83	20,450	11.21	12,000	13.67	45,387	9.76	9.40	36,450	8.44
Elevators	.....	.....	.....	.....	.....	.....	.....	20,000	22.78	.....	.....	.....	.....	.....
Intercommunication systems & TV	.....	.....	.....	1,182	0.51	.....	.....	.....	.....	.....	.....	.....	.....	.....
Dark room cabinets	.....	.....	.....	.....	.....	614	0.34	.....	.....	.....	.....	.....	.....	.....
Xray room door & frame	.....	.....	.....	.....	.....	640	0.35	.....	.....	.....	.....	.....	.....	.....
Division curtains	.....	.....	.....	.....	.....	1,017	0.56	.....	.....	.....	.....	.....	.....	.....
Special room partitions	.....	.....	.....	.....	.....	357	0.20	.....	.....	.....	.....	.....	.....	.....
Phone booth	.....	.....	.....	.....	.....	620	0.34	.....	.....	.....	.....	.....	.....	.....
Kitchen equipment	.....	.....	.....	14,636	6.37	.....	.....	.....	.....	.....	.....	.....	.....	.....
Miscellaneous undistributed	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11,805	2.73
General conditions & bond	.....	.....	1.6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
										Total $464,877	100%			
Drives & blacktop areas	.....	.....	.....	.....	.....	.....	.....	.....	.....	18,150	.....	.....	.....	.....
Total Cost	$268,000	100%	100%	$229,600	100%	$182,434	100%	$87,805	100%	$483,027	.....	100%	$431,723	100%

* Exclusive of drives & blacktop area † Including drives & blacktop area

a Incl sheet metal b Incl $11,800 for air conditioning

This report and the six other buildings reported in this issue, are the fifteenth in Engineering News-Record's Building Dollar series. Earlier reports were published in ENR Oct. 8, 1953; Sept. 29, 1955; July 5, 1956; Aug. 2, 1956; Dec. 6, 1956; Oct. 17, 1957; Mar. 20, 1958; Sept. 18, 1958; Dec. 25, 1958; Mar. 19, 1959; June 18, 1959; Sept. 17, 1959; Dec. 17, 1959.

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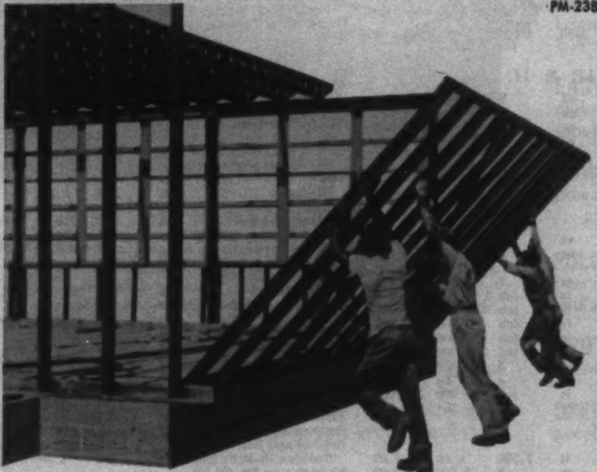

NEW ENGLAND
Frank W. Baldwin Co., Boston, Mass.
Bernardston Welding, Inc., Greenfield, Mass.
Metal Building Specialties, Portland, Me.
United Structural Steel Co., Worcester, Mass.

MIDDLE ATLANTIC
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Industrial Engr. Works, Trenton, N. J.
The McGregor Architectural Iron Co., Inc., Scranton, Pa.
George Miller Brick Company, Rochester, N. Y.
Nelson Light Steel Company, Syracuse, N. Y.
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Montague-Betts Company, Richmond, Va.
Roebuck Buildings Company, Roebuck, S. C.
Southern Fabricating, Inc., Staley, N. C.
Steel Builders, Inc., Columbus, Ga.

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Don King Building Supplies, Inc., Jackson, Ohio
Harris & Fischer Iron Works, Inc., Saginaw, Mich.
Haven-Busch & Sons, Grandville, Mich.
Lightmetals Construction Products Co., Livonia, Mich.
Northeastern Boiler & Welding, Ltd., Green Bay, Wis.
Bertel Peterson Company, Rockford, Ill.
R. & W. Supply Company, Logansport, Ind.
The Steel Buildings Company, East Peoria, Ill.

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Englert Engineering Company, Nashville, Tenn.
Perry Lumber Company, Inc., Lexington, Ky.
Snead Iron Works, Inc., Louisville, Ky.
Tucker Steel Corp., Knoxville, Tenn.

WEST NORTH CENTRAL
B & C Corp., Kearney, Neb.
B & C Corp., Lincoln, Neb.
B & C Steel Products Co., Scottsbluff, Neb.
Builder's Specialties Co., Faribault, Minn.
Abe W. Mathews Engr. Co., Hibbing, Minn.
Southwest Ornamental Iron Co., Kansas City, Mo.
Steel Structures, Inc., Minneapolis, Minn.

WEST SOUTH CENTRAL
Darbyshire Steel Company, El Paso, Tex.
Darbyshire Steel Company, Odessa, Tex.
The Jim Doyle Company, Houston, Tex.
Graham Steel Structures, Inc., Dallas, Tex.
Irwin Steel Company, San Antonio, Tex.
Panhandle Steel Bldgs. Co., Amarillo, Tex.
Patterson Steel Company, Oklahoma City, Okla.
Patterson Steel Company, Tulsa, Okla.
Steel Bilt Products Co., Lubbock, Tex.
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C & R Distributing Co., Phoenix, Arizona
Idaho Acoustical & Bldg. Specialties Co., Boise, Idaho
Rio Grande Steel Products Co., Albuquerque, N. M.
Steel Structures of Colorado, Inc., Englewood, Col.

PACIFIC
Chambers Steel Company, San Diego, Calif.
Dix Steel Company, Spokane, Wash.
Fabricated Building Items Co., Los Angeles, Calif.
Portland Wire & Iron Works, Portland, Ore.
Tayler Products Corp., Burlingame, Calif.
Tayler-Spotswood Northwest, Inc., Seattle, Wash.

EXPORT
Hernandez Enterprises, Hato Rey, Puerto Rico
Lacy Manufacturing Company, Honolulu, Hawaii

CIRCLE 123 ON READER SERVICE CARD

Titan Missile Complexes, California

Tight completion schedules and change order expectations challenge contractor for air base complexes

Three Titan missile installations at the Beale Air Force Base, Calif., to cost the Corps of Engineers, Sacramento, $30,157,151, went to Peter Kiewit Sons' Co., Arcadia, Calif., on a low bid less than 5% under the engineers estimate and 4% under the second bid of George A. Fuller Co., Los Angeles.

The installations will be at three sites: complex 1A, vicinity of Lincoln, Placer County; 1B, near Pennington, Sutter County; 1C, near Chico, Butte County.

The nine missile silos at $745,000 each, account for over 22% of the total cost.

The work included, the tight completion scheduling and the liquidated damages, as outlined in the accompanying table, illustrate what the contractor is up against. But in addition, continuing research is expected to develop rapid obsolescence of design and to necessitate change orders as work progresses.

Performance Sch. & Liq. Damages

Structure or Facility	Completion Dates Complex 1-B	1-C	1-A	L dam/ cal day each
Missile silos,				
struct, elec & mech wk, incl clean propellant ldg sys...c	4- 1-61	5- 1-61	6- 1-61	$300
backfill...c	1-15-61	2-15-16	3-15-61	50
closure drs, instal..c	11- 1-61	12- 1-61	1- 1-62	50
final test, propellant loading sys...c	12- 1-61	1- 1-62	2- 1-62	100
Equipment terminals,				
struct, elec & mech work...c	5- 1-61	6- 1-61	7- 1-61	200
backfill, excl access closure...c	2- 1-61	3- 1-61	4- 1-61	50
Propellant terminals,				
struct, elec & mech wk, incl clean propellant load sys..c	5- 1-61	6- 1-61	7- 1-61	300
backfill, excl access closure...c	2- 1-61	3- 1-61	4- 1-61	50
Final test, propellant loading sys...	12- 1-61	1- 1-62	2- 1-62	100
Control center,				
struct, elec & mech wk, compl exc setting blast sensing heads...	4- 1-61	5- 1-61	6- 1-61	700
bkfl, setting blast detector heads...c	8-15-61	9-15-61	10-15-61	200
Antenna silos,				
struct, elec & mech work...c	5- 1-61	6- 1-61	7- 1-61	200
backfill...c	3- 1-61	4- 1-61	5- 1-61	50
Tunnel junction #10,				
struct, elec & mech work...c	4- 1-61	5- 1-61	6- 1-61	100
backfill...c	9- 1-61	10- 1-61	11- 1-61	50
Powerhouse, inc air intake & exhst structs, tp F tunn & tunn jcts #11 & 13,				
struct (exc 16x16' temp openg), elec & mech work...c	5- 1-61	6- 1-61	7- 1-61	700
closure, 16x16' temp access & bkfl...c	7-15-61	8-15-61	9-15-61	200
Port, silo struct, elec, mech work, bkfl...c	7-15-61	8-15-61	9-15-61	200
Comm antenna, struct, elec & mech work.c	12-15-61	1-15-62	2-15-62	100
backfill...c	7-15 61	8-15-61	9-15-61	50
Antenna terminal,				
struct, elec & mech work...c	5- 1-61	6- 1-61	7- 1-61	100
backfill...c	2- 1-61	3- 1-61	4- 1-61	50
Tunnels, tunn juncts, blast locks & launcher area filtra struct (exc. antenna term & tunn juncts #10,11,13				
struct, elec & mech work...c	4- 1-61	5- 1-61	6- 1-61	400
backfill...c	6-15-61	7-15-61	8-15-61	100
Orientation targets...c	5- 1-61	6- 1-61	7- 1-61	50
Access road...c	4- 1-61	5- 1-61	6- 1-61	100
Finish site grading & roads...c	12- 1-61	1- 1-62	2- 1-62	200
Sewage facil, soil stab & remaining wk...c	12- 1-61	1- 1-62	2- 1-62	100
Security fencing...	2-25-60	2-25-60	2-25-60	...
Security lighting...	4- 1-61	5- 1-61	6- 1-61	...
Segre storage magazine	12- 1-61	1- 1-62	2- 1-62	...

c Complete

The government will furnish $4,500,000 worth of mechanical and electrical equipment.

Prevailing wages at the three sites include: carpenter, $3.58; tractor operator, $3.79; crane & power shovel operator, $4.08; common laborer, $2.865. Electricians are paid $4.17 in Sutter County, and $4.06 in Placer and Butte Counties.

Work on the complexes was started on Jan. 14.

The bidding included:

1C	Peter Kiewit Sons' Co., Arcadia, Calif	$30,157,151
2	Geo. A. Fuller Co., Los Angeles	31,291,035
7	*Yuba Area Constructors, Calif	34,960,572
EE	Corps of Engineers, Sacramento	31,702,258

* A joint venture of Fred J. Early, Jr. Co., Inc., San Francisco; Gordon H. Ball, Inc., Danville; Ball & Simpson, Berkeley; M & K Corp., San Francisco: Anderson & Rowe, Inc., San Francisco; Harms Bros., Sacramento; and Rothschild, Raffin & Weirick, Inc., San Francisco.

Bids: 1-12-60 Items	Unit	Quantity	Unit Prices 1C	2
Complexes 1A, 1B & 1C				
Missile silo	ea	9	$745,000	$700,000
Equipment terminal	ea	9	390,000	350,000
Propellant terminal	ea	9	365,000	450,000
Control center	ea	3	510,000	630,000
Antenna silo pairs & terminal	ea	3	314,000	250,000
Pwrhse air intake & exhaust structs, connecting duct & tunnel junctions #11 & 13 w fuel storage tanks	ea	3	1,975,000	2,300,544
Entry portal silo	ea	3	272,000	300,000
Launcher area air filtration structure	ea	3	109,000	85,000
Steel tunnels	ls	job	2,660,000	2,885,000
Tunn juncts #1, 2, 4, 5, 7	ls	job	715,000	650,000
#8 & 9	ls	job	280,000	250,000
#10	ls	job	387,000	460,000
#12	ls	job	200,000	300,000
Blast lock #1	ea	3	222,000	175,000
#2	ea	3	168,000	110,000
Orientation targets	ls	job	16,000	18,000
Water distri system	ea	3	16,001	5,000
Waste System				
Force main sewer pipe	lf	1,300	9.00	4.00
Sewage treat facilities	ea	3	6,700	3,000
Dr structs, seal chambr	ea	18	1,200	750.00
Electrical: hazard alert lts, junct boxes, handholes, tel MHs, undgnd feeders & conduits	ls	job	45,000	20,000
Grading, Roads & Paved Areas				
Exc & subgrade prep	cy	73,010	$0.80	$1.10
Embankment	cy	335,700	0.95	0.85
Subbase	cy	9,920	2.40	2.30
Stab aggr base & surf courses	t	16,920	2.25	3.00
Prime coat	t	37	46.00	35.00
Bit surface course	t	3,654	10.50	10.00
Asphalt cement	t	192	10.50	33.00
Concrete paving	cy	330	25.00	39.00
Culverts, 12"	lf	40	4.50	4.00
18"	lf	284	5.50	5.00
protection	ls	job	350.00	500.00
Guide & grd posts, culv mrkrs, wheel bumpers, parking area striping, bronze crane markers, ditch checks	ls	job	2,500	2,400
Water for compaction	Mgal	18,000	2.05	2.00
Security fencing, motorized gates	ls	job	38,000	40,000
lighting system & supply transformers	ls	job	49,400	55,000
Storage base segregated magazine	ea	3	3,900	2,000
Communi antenna silo	ls	job	17,700	12,000
Erosion control seeding	ac	115	59.00	57.00
Portland cement	bbl	135,000	4.35	4.16
Gatehouse/vehicle storage building	ea	3	24,000	12,000
Access Roads				
Clear & grub	ls	job	2,600	20,000
Exc, uncl, complex 1A	cy	9,200	0.55	0.90
1B	cy	43,000	0.62	1.00
1C	cy	7,500	0.62	0.95
Embankmt, Complex 1A	cy	5,400	0.15	0.60
1B	cy	30,600	0.15	0.55
1C	cy	4,700	0.15	0.85
Select matl, subbse crse	cy	11,500	2.40	3.00
Stab aggr base crse	t	15,700	2.30	5.00
Water for compaction, Complex 1A	Mgal	500	2.10	4.00
1B	Mgal	2,300	2.10	4.00
1C	Mgal	1,000	2.10	4.00
Liq asph type MC-l, prime coat	t	80	43.50	38.00
Asph cmt, 85-100 pene	t	210	10.50	37.00
conc, surfacing	t	3,320	10.50	10.50
CMP culvert, bit ctd,				
18", 16 gage	lf	422	6.00	8.00
24", 14 gage	lf	221	9.00	12.00
24", 16 gage	lf	132	8.25	12.00
30", 14 gage	lf	53	12.00	16.00
36", 14 gage	lf	48	13.00	20.00
42", 12 gage	lf	82	18.50	25.00
60", 10 gage	lf	176	35.00	45.00
66", 10 gage	lf	52	40.00	52.00
78", 10 gage	lf	88	45.00	65.00
CMP arch culv, bit ctd, 43x27", 12 gage	lf	112	20.00	27.00
slve for irri ditch xing, unctd, 18", 16 gage	lf	56	5.50	7.00
Flared met end section,				
18"	ea	16	30.00	44.00
24"	ea	5	42.00	66.00
30"	ea	2	65.00	88.00
36"	ea	2	100.00	140.00
42"	ea	2	160.00	240.00
43x27"	ea	4	90.00	130.00
Headwall for CMP,				
18" L type	ea	2	150.00	150.00
24" breast type	ea	2	250.00	200.00
60" dble, wing type	ea	1	850.00	1,500
66"	ea	1	850.00	1,200
78" double	ea	1	1,300	1,600
Endwall for CMP,				
24" breast type	ea	2	250.00	200.00
60" dble, wing type	ea	1	850.00	1,500
66"	ea	1	850.00	1,200
78" double	ea	1	1,300	1,600
Conc farm equip xing, class AA	ls	job	325.00	1,000
Fence, 4 str barb wire	lf	9,000	0.52	1.00
Metal gate, 42"x14'	ea	5	67.00	100.00
Cattle guards	ls	job	8,990	15,000
Culvert markers	ea	45	7.80	7.00
Guide posts	ea	180	7.25	6.00
Traffic control signs	ls	job	1,200	180.00
Striping & marking	sf	4,600	0.26	0.20
Erosion control seeding	ac	13	59.00	125.00
Sacked concrete riprap	bag	825	1.40	1.60
Portland cement	bbl	100	4.35	5.60
Reloc of pole line, Complex 1B-Butte site	ls	job	5,200	2,000
Mineral aggr for dbl bit surfacing	t	940	8.30	4.00
Emuls asph, type RS-1 for dbl bit surf	t	75	52.00	37.00

(Unit Prices continued on p. 128)

LeTOURNEAU-WESTINGHOUSE

—for your long hauls
—rough terrain
—extra speed..

SPEEDPULL is a 6-wheel version of the C TOURNAPULL®, generally recognized as the "standard of the industry". This versatile machine has 276 hp, 20 yd heaped capacity. It has the strongest frame built, quickest accessibility of all components; only one lube-point on prime-mover needs daily service. Owners say it's the easiest earthmover in the world to maintain!

Step-up your yardage with 37 mph

LW SPEEDPULL®

Two loads every trip!

Tandem scrapers are easily adapted to Speedpull with the new LW Tandem hitch. One prime-mover, one operator, and two 20-yd Fullpak® scrapers... doubles your capacity to 40 yd per trip! You save money... you make bigger profits. Ask for full details.

You've never seen *speed* in an earthmover until you climb aboard Speedpull and open the throttle! Loaded or empty, this machine works fast... delivers bigger yardages to make extra profit for you every work-day. See it demonstrated!

TOP POWER-TO-WEIGHT RATIO—With 276-hp Cummins diesel, Speedpull has only 336.9 pounds of total *loaded* weight per horsepower. You have the best power-to-weight ratio of *any* 6-wheel scraper, for top performance and efficiency.

EXCLUSIVE HYDRAIR* SUSPENSION—With this system no front axle is necessary. Thus, you have higher ground clearance, no troublesome front axle "dozing" action, and a shorter turning radius.

EXCLUSIVE LW ELECTRIC CONTROLS—Instant-response electricity gives you positive control of tailgate, apron, and bowl lift. LW "electrics" are weatherproof, easy to operate, easy to maintain.

EASY-LOADING FULLPAK® SCRAPER—Low angle loading, with wider entry for dirt... You get the fastest-loading scraper in earthmoving! 20 yd heaped, 14 yd struck capacity.

POWER-TRANSFER DIFFERENTIAL—Automatically transfers power from spinning drive-wheel to drive-wheel on better footing ... gives you traction when other units bog down.

FULL-POWER STEER—You have exceptional maneuverability, precision control with LW feather-touch steering. Shockproof linkage. 41'2" long, Speedpull U-turns 180° in only 34'.

SPOT-TURN BRAKES—Hand-lever sets brakes on either drive-wheel, for quick, sure, sharp turns.

SPEEDS TO 37.4 MPH—Speedpull gives you fast get-away, rapid acceleration, and hauling speeds to 37.4 mph.

*Trademark CSP-2259-DC-1

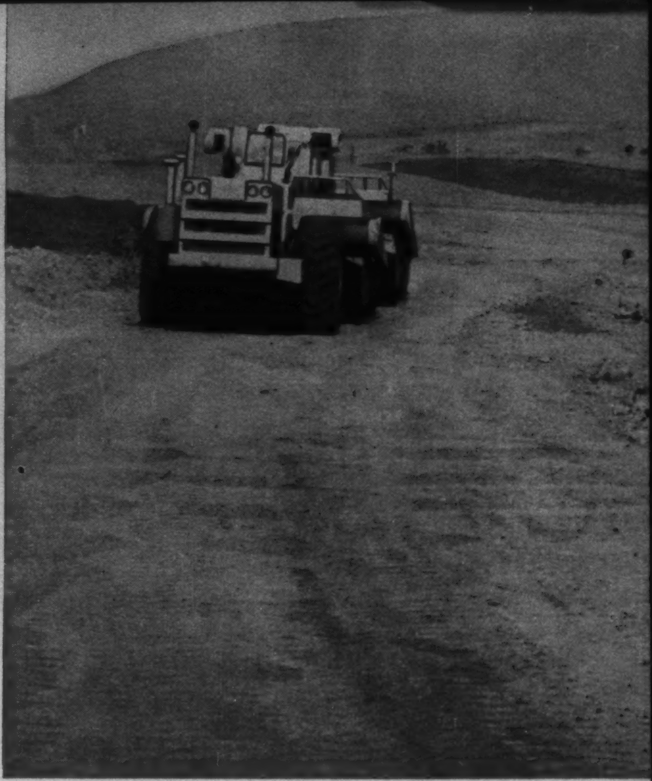
LW **LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS
A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

CIRCLE 125 ON READER SERVICE CARD

On 2250' cycles, 2 Tournapulls with tandem scrapers move*

12 pay-yards per minute per shift



Here's earthmoving that really cuts costs! Just 2 Tournapulls — V-power "C's" with tandem Fullpak® scrapers — moved 6840 yards per 10-hr day, according to Arnold Holub, job superintendent for Martin Brothers, Inc., Concord, California. This remarkable production was obtained as the LeTourneau-Westinghouse Tandems moved 325,000 yd to build streets and lots at Terra Hills Housing Development, Pinole, Calif. Cycles averaged 2250 feet.

Detailed records on the firm's tandem "C's" show these averages:

Load time, using one 191-hp pusher.................................1 minute (to load *both* scrapers)

Pay-yards moved per trip, per machine.....24 cu yd

Completed cycles, both LW 'Pulls* per 10-hr shift ....285 cycles

Production for both Tandems, per shift..6840 cu yd

Owners Floyd and Bill Martin say, "We sure like these C 'Pull Tandems ... *they really help us lower earthmoving costs.*" Superintendent Holub adds, "These Tandems are a great step forward in earthmoving ... comparable to the first Tournapull that put earthmoving on high-speed rubber!"

Operating cost of Tandems almost same as for single scraper

LW Tandems give you *double* capacity each trip, yet operating costs are practically the same as with

LW Tandem makes U-turn as it starts trip back to cut. This high-production machine needs less *space* for turn-around than some single-unit scrapers having *less* capacity than the tandem "C".

C 'Pull Tandem spreads *two* loads in low area at Terra Hills Housing Development. Operator controls action of bowl, apron, and tailgate of both scrapers with simple easy-to-use fingertip switches.

"singles". Just one operator handles both scrapers. You have, of course, 2 more tires to maintain, plus nominal maintenance of the second scraper, but there is no extra engine, no extra transmission, no extra final-drive to care for! What's more, since only one of the tandem scrapers loads at a time, you don't need "super" or tandem-pushers. You save pusher-positioning time, too.

LW "electrics" make Tandems practical

The chief reason *only* LW offers you a practical tandem operation is because of its exclusive electric-control system. Unlike mechanical or hydraulic power, electricity arrives at its point-of-action instantaneously, with no loss of power, and with no extra power-source needed. A rugged universal swivel-hitch joins front and rear scrapers, lets your operator perform every standard maneuver, including full back-ups with *no* tendency to jack-knife.

Ask us for complete facts on LW Tandems. Remember, too, that your present 'Pulls can be converted to tandem operation.

*Trademark TP-2272-DCJ-2

9 minutes to add 2nd scraper

Martin Brothers, Inc., finds it's fast and easy to add the extra LW scraper, or to take it off, as conditions demand. To hook-up the 2nd scraper, for example, operation took only 9 *minutes*. A single heavy-duty bolt and nut connects the 2nd scraper securely to a universal-swivel hitch . . . and electric and air lines are easily plugged-in to jacks at the hitch. That's all there is to it!

Martin Brothers also uses C 'Pulls to cut costs when towing big water wagons. Owner reports that three 4000-gal. truck units would have been needed to equal the performance of the 6000-gal. "C" tanker.

LW **LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

Where quality is a habit

CIRCLE 127 ON READER SERVICE CARD

stop

FACTS YOU SHOULD KNOW
ABOUT WALJOHN WATERSTOP

Check these 9 Points...
and then Specify
WALJOHN WATERSTOP

DO YOU KNOW?

1. WALJOHN PVC* Waterstops are proved to be 100% watertight.
2. WALJOHN PVC* Waterstops are virtually indestructible.
3. WALJOHN PVC* Waterstops are unaffected by their environment.
4. WALJOHN PVC* Waterstops are simpler to install than conventional metal or rubber waterstops.
5. WALJOHN PVC* Waterstops are manufactured in acccordance with U.S. Army Corps of Engineers Tentative Works Guide CE. #1402 and Ontario, Canada, Hydro-Electric Commission C-245-55.
6. WALJOHN PVC* Waterstops are joint-fused thermostatically by a specially made heat unit supplied by the Waljohn Company.
7. WALJOHN PVC* Waterstops are made in every shape and profile required in a PVC Waterstop.
8. WALJOHN PVC* Waterstops are prime-manufactured by the Waljohn Company in their own plant and certified to rigid specifications by one of America's oldest testing companies, The U.S. Testing Co., Inc.
9. WALJOHN PVC* Waterstops are being installed or have already been installed in every state in the Union in all types of construction.

An ample listing of installations is yours upon request.

WALJOHN WATERSTOP INC.
400 88th Street, B'klyn 9, N. Y.
SHORE ROAD 8-0300

Please send me your FREE Illustrated Brochure, List of Installations, Profile Sheet and Samples.

Name of Firm ____________
Street ____________
City ____________ Zone ____ State ____

*PVC is Plastic

Tunnel excavation is 19% of total cost of . . .

Flood Control Diversion Tunnel

Tunnel excavation, 13,600 cu yd at $13.50 a yd, accounts for 19%, and concreting for almost 35% of the $960,373 cost of constructing a flood control tunnel on the Pound River, near Haysi, Dickenson County, Va., for the John W. Flannagan Dam and Reservoir project.

The Huntington, W. Va. Corps of Engineers' award (5.5% above the engineers estimate, which did not include profit) went to Harrison Construction Co., Alcoa, Tenn.

Work includes construction of a concrete-lined horseshoe diversion tunnel 780 ft long and 16 ft high, a 35.5 ft long concrete transition section, two concrete portals 27.5 and 24 ft long, respectively, a 45-ft-long concrete outlet flip bucket; consolidation and contact grouting of tunnel; and related work and appurtenances.

Cement content of concrete is 4½-6 bags per cu yd, depending upon size, type and gradation of aggregates, and on structural requirements.

Since the project is approximately two miles from the nearest suitable road, an access road will be provided for that distance. The railroad is an equal distance from the site.

Minimum wages range from a high of $2.97 for skilled, through $2.50 for semi-skilled, to $1.50 for common laborers. Carpenters are paid $2.50, and electricians, $2.70.

1C	Harrison Constr. Co., Alcoa, Tenn.	$960,373
2	Geo. M. Brewster & Son, Inc., Bogota, N. J.	986,805
10	Dravo Corp., Neville Isl., Pittsburgh, Pa.	2,071,275
EE	Corps of Engineers, Huntington, W. Va.	909,777*

* Does not include profit

Bids: 1-20-60 Items	Unit	Quantity	Unit Prices 1C	2
Clearing, class 1	ac	5	$600.00	$1,000
class 2	ls	job	6,000	67,000
Excavation in open cut, earth	cy	2,800	4.00	1.25
rock	cy	14,960	6.00	2.25
surface protection	sy	200	6.00	9.00
Line drilling	sf	16,000	2.50	2.50
Excavation, tunnel	cy	13,600	13.50	13.80
rock surface protection	sy	700	5.00	9.00
Steel tunnel supports	lb	177,000	0.30	0.34
Rock bolting—rock bolts with appurtenances, in tunnel, 4' long	ea	1,600	6.25	10.00
over 4'	lf	3,200	1.10	2.00
open cut, in ungrtd holes	lb	2,300	0.50	1.00
in gtd holes	lb	6,700	0.55	1.00
Drill & grtg equip, mobilize & demobilize	ls	job	9,000	3,000
Drill 1½" grout holes (ex)	lf	3,400	4.00	2.95
3" drain holes in tunn.	lf	3,300	5.50	4.25
Pipe for grout holes, air vents & drain holes	lb	7,500	0.50	0.35
Connections to grout holes	ea	535	5.00	5.00
Portland cement in grout	cf	3,000	1.35	1.65
Placing grout, consolidation & collar grouting	cf	3,000	5.00	2.95
Placing grout, contract grtg.	cf	2,700	3.50	3.50
Drill 3" drain holes in fndn or open cut	lf	300	4.50	4.25
& grout 3" holes for anchor bars	lf	210	2.50	3.00
Derrick stone	cy	2,000	25.00	20.00
Dumped rock	cy	400	5.00	5.00
Concrete in flip bucket	cy	1,030	30.00	35.00
in tunnel lining	cy	5,070	33.50	35.00
in transition	cy	710	33.50	35.00
in portals, including piers	cy	1,250	33.50	40.00
Portland cement	bbl	12,000	5.50	6.00
Steel reinforcement	lb	555,000	0.13	0.15
Rubber waterstop	lf	650	4.25	3.00
Cast steel pier nosing	lb	3,900	0.30	1.00
Cast iron drain line in flip bucket, 8"	ls	job	380.00	500.00
Barrier fence	lf	420	30.00	12.00

Completion schedule: 420 cal days
Liquidated damages: $500/day

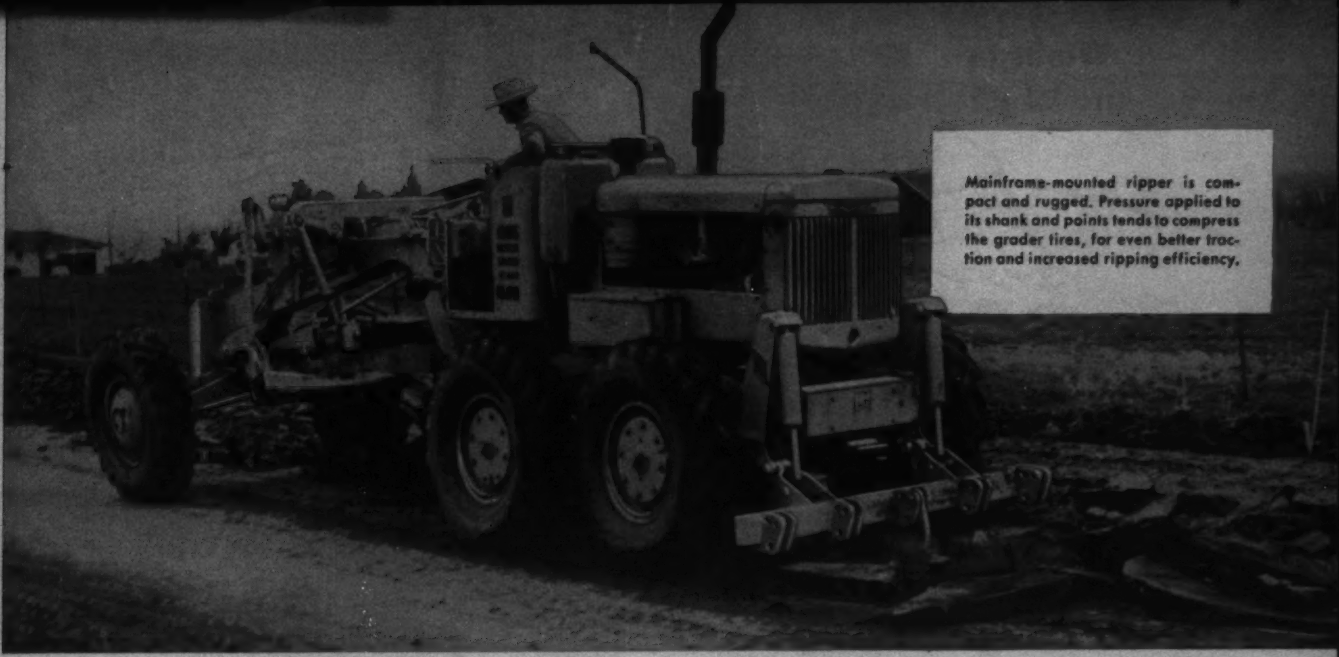
Highway Prices—District of Columbia

Average Range of Contract Prices, 1959—2nd Half

Bid Awards, 1959—2nd Half

Items	Unit	No. Jobs	Unit Prices Avg.	Range
Roads				
Excavation, ordinary	cy	6	$2.60	$2.00- $3.40
hard surface	cy	6	3.72	3.00- 5.40
hand	cy	6	12.16	4.00- 16.00
Borrow for embankments	cy	5	3.39	2.98- 4.00
soils base	cy	5	3.52	2.98- 4.00
Interceptor drains, 6"	lf	3	2.83	2.50- 3.00
8"	lf	2	4.25	3.50- 5.00
Trench excavation, add	cy	3	4.66	2.00- 6.00
Connecting pipe, 6"	lf	3	2.73	2.50- 3.00
8"	lf	2	4.25	3.50- 5.00
Borrow, trench backfill	cy	3	4.16	2.98- 6.00
Lumber, left in place	Mbf	2	22.50	20.00- 25.00
Reinf PCC pvt, 8"	sy	3	7.27	5.63- 8.35
	cy	4	38.50	25.00- 60.00
Wire fabric reinf, 50#	sy	6	0.70	0.55- 0.80
Expansion joint filler	lf	4	1.31	1.25- 1.50
Standard cement, add	bbl	5	4.75	4.00- 5.50
Calcium chlor accel	lb	5	0.04	0.02- 0.05
Reinf PCC base, 8"	sy	3	7.10	6.40- 7.50
	cy	5	31.64	28.00- 35.00
PCC drwy & alley entr, 7"	sy	5	8.32	6.60- 12.00
Expansion jt filler for alley & drwys	lf	5	0.83	0.45- 1.25
PCC sidewalk	sy	4	5.11	4.50- 5.50
repairs	sy	5	5.68	5.00- 6.00
Expan jt filler, sidewks	lf	6	0.54	0.30- 0.65
PCC curb, "A", 15"	lf	4	$3.63	$1.75- $6.00
variable W & D	cy	2	60.00	45.00- 75.00
comb curb & gut, "A"	lf	5	3.58	3.20- 4.00
gutter	sy	4	8.70	7.00- 10.00
cl A bus stops	cy	1	34.00	34.00- .....
cl B islands	cy	3	55.66	42.00- 65.00
Brk sidewk repair/repl	sy	2	2.35	1.00- 3.70
Cut to neat line	lf	3	1.33	1.00- 2.00
Anchor bolts	ea	5	2.76	1.80- 5.00
Stn curb, circ, 8x12", set	lf	3	3.53	1.80- 5.00
reset	lf	2	4.40	3.80- 5.00
str or circ, 8x8", 8x12", 6x20", reset	lf	2	2.35	1.70- 3.00
Old curb hauled to D.C. property yard	lf	3	0.66	0.20- 1.00
MH fr & basin cover...adj	ea	6	10.91	6.00- 15.00
Wat vlv fr casing...adj	ea	5	13.00	6.00- 30.00
PUC MH frames, under 6 sf...adj	ea	4	3.62	1.00- 7.50
6-15 sf...adj	ea	4	3.87	1.00- 7.50
over 15 sf...adj	ea	4	6.25	2.00- 15.00
Sht asph pvt, incl modified binder	sy	2	2.05	2.10- 2.00
Asph conc binder	t	2	18.00	18.00- 18.00
modified	t	3	15.33	12.00- 19.00
Sheet asph surface	t	4	19.03	14.00- 24.40
Asph conc base, cl A	t	6	13.50	8.00- 15.00
surface, cl C	t	5	18.80	16.00- 22.00
Asph surf by heater method...repair	t	2	28.00	27.00- 29.00
PCC, cl B, wall, step, coping	cy	2	74.00	48.00-100.00
Topsoil, 4" deep	sy	3	0.93	0.75- 1.25

(Continued on p. 132)



Mainframe-mounted ripper is compact and rugged. Pressure applied to its shank and points tends to compress the grader tires, for even better traction and increased ripping efficiency.

NOW AVAILABLE...Rear Rippers for LW Graders

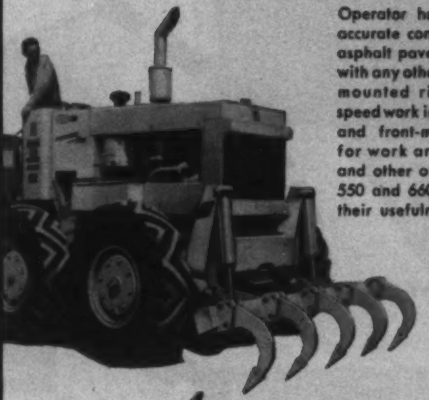
Available now, for use with LW 550 or 660 motor graders, is this new heavy-duty ATECO *ripper*. Attached to the rear of a big LeTourneau-Westinghouse grader, it breaks up heavy and tough materials, *at fast speed* . . . gives new versatility to motor graders.

Easily and quickly mounted to LW's massive, one-piece frame, the ripper operates through the grader's hydraulic system. Its shank shape and point angle . . . teamed with the power and weight of the "550" or "660" . . . provides quick penetration, to any depth up to 12 inches. The ripper greatly increases the usefulness of your LW grader, and makes it a one-man "wrecking" tool that will let you handle more work at a saving in time and equipment.

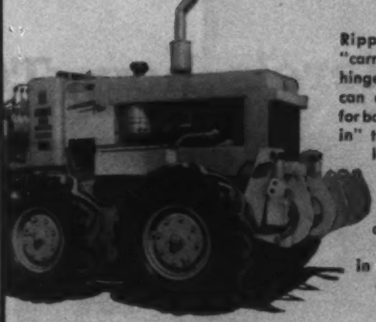
Fully-tested, fully-approved

This new attachment was engineered especially for the LW 550 and 660 by ATECO, a pioneer designer and developer of ripper attachments. The unit has been made available only after months of testing and successful application on LW graders, where it proved its money-making potential.

This new money-saving attachment is available with several different shank shapes, for various jobs, and can be mounted to "660" or "550" graders in the field, or purchased as optional equipment with new graders. Ask for full details.



Operator has complete and accurate control, can "scalp" asphalt pavement faster than with any other tool. With rear-mounted ripper for high-speed work in tough materials, and front-mounted scarifier for work around manholes and other obstructions, LW 550 and 660 graders add to their usefulness.



Ripper is shown in raised "carry" position, using one hinge pin. Unit's raised shanks can also be pinned rigidly, for bank, corner, or any "back-in" type work. Ripping is a logical utilization of the excellent power and traction characteristics of the big LW 550 and 660 graders, which offer 123 and 160 hp in "straight-shift" models, and 145 and 190 hp in POWER-Flow® torque-converter models.

G-2244-G-1

LW

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

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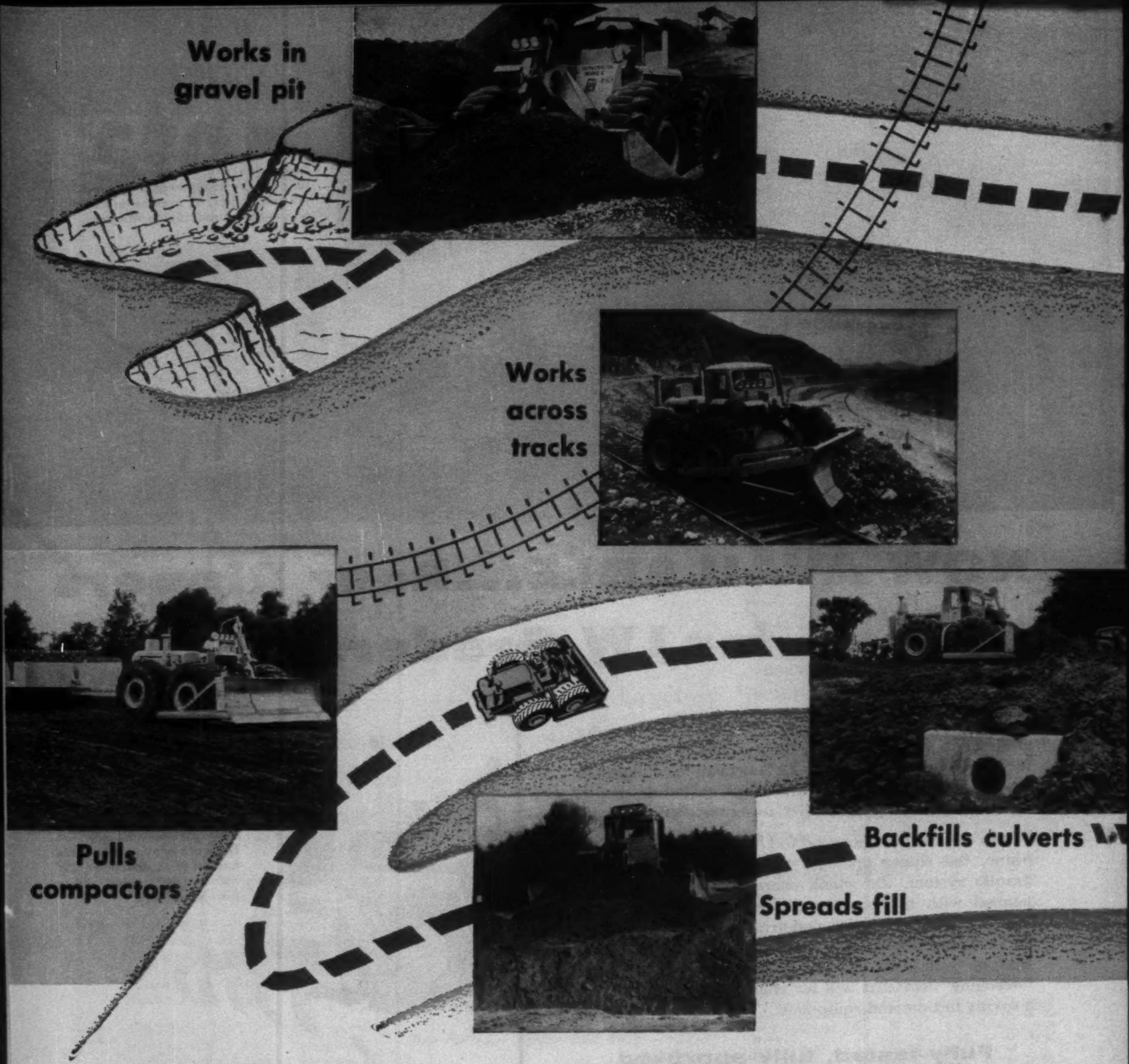
☎

CIRCLE 129 ON READER SERVICE CARD


Works in gravel pit
Works across tracks
Pulls compactors
Backfills culverts
Spreads fill

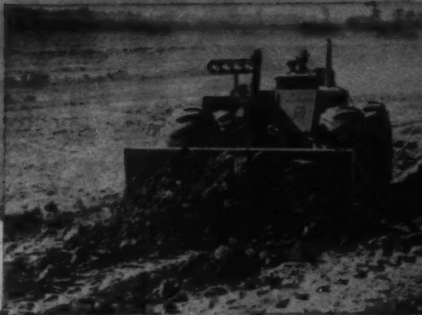
Here's how TOURNATRACTOR® puts

Handles more tractor jobs over a wider area...faster

RUNS from one assignment to another, at speeds to 17.2 mph. Travels anywhere, without "piggy-back" assistance.

Because of its rubber-tired *speed . . . power . . .* and *mobility* . . . Tournatractor gets around the job *fast* . . . often does the work of 2 or 3 slow-moving crawlers. You need *fewer* tractors on your spread when you work a Tournatractor . . . and the saving is *yours.*

Cleans up haul road



Cleans up in borrow pit

Push-loads scrapers

Pulls scrapers

Cleans around shovels

Fills-in washes

extra dollars in your pocket!

Get the full story on 218-hp Tournatractor from your LeTourneau-Westinghouse Distributor. He will be happy to arrange a demonstration so you can see the profit-possibilities for you in this fast, rubber-tired, heavy-duty tractor. Meantime, send for your copy of our all-new 16-page Tournatractor data book.

CT-2197-DC-2

LW **LeTOURNEAU-WESTINGHOUSE COMPANY,** PEORIA, ILLINOIS

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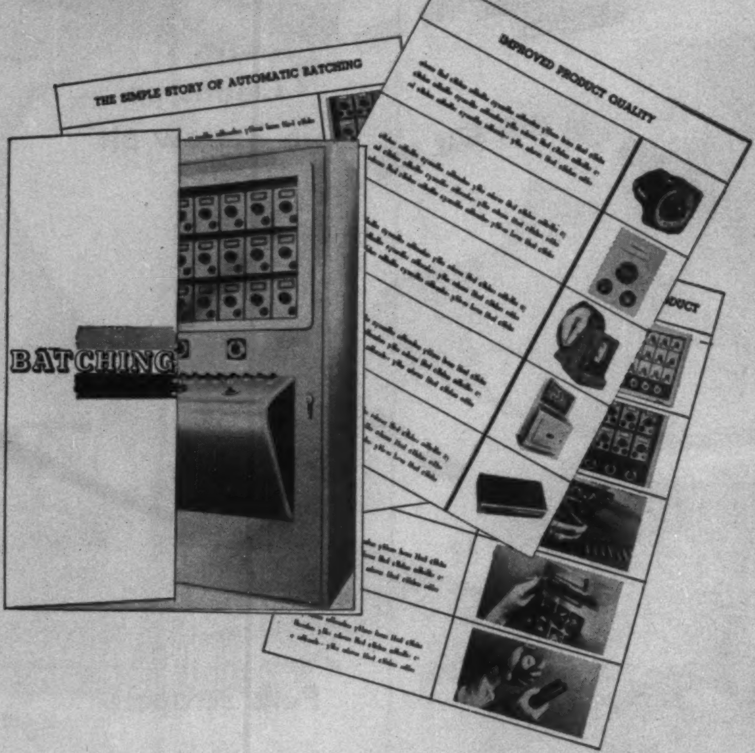
CIRCLE 131 ON READER SERVICE CARD

AUTOMATIC
BATCHING
HANDBOOK


THE SIMPLE STORY OF AUTOMATIC BATCHING
IMPROVED PRODUCT QUALITY
BATCHING

EVERYTHING YOU NEED TO KNOW ABOUT
AUTOMATIC BATCHING

- HOW TO DO IT
- HOW MUCH IT COSTS
- WHAT YOU NEED
- HOW TO USE WHAT YOU HAVE
- HOW TO SELECT THE RIGHT SYSTEM

If you are now combining two or more ingredients in any kind of formula or batch, write now for this new *free* automatic batching handbook. It describes in detail how automatic batching works, how to convert existing plant facilities or plan new plants for automatic operation. It illustrates the latest batching systems available, lets you select the right type for your particular needs. Also shows you how to combine materials handling equipment, storage facilities, and weighing equipment for greatest economy, increased production. This is the newest, most complete handbook on automatic batching available—be sure to write for your free copy today!

HOWE
THE HOWE SCALE CO. • RUTLAND, VT.
A SUBSIDIARY OF SAFETY INDUSTRIES, INC.

. . . D. C. highway prices

Items	Unit	No. Jobs	Unit Prices Avg.	Range
Sod-sodding, incl topsoil..	sy	2	$0.80	$0.60- $1.00
Sewer & water MH frames & covers..........furn	ea	3	56.66	40.00- 75.00
PCC, reinf, circ curb.....	lf	2	4.27	3.75- 4.80
& gut	lf	2	4.25	4.00- 4.50
Cmt conc circ curb for alley & dwy crn............	lf	2	3.40	3.00- 3.80

Bridges

Items	Unit	No. Jobs	Avg.	Range
Excavation, uncl.........	cy	1	9.00	9.00- .....
structural....	cy	2	11.00	9.00- 12.00
Backfill & fill............	cy	3	5.05	3.15- 8.00
Conc, cl BB, subfndn.....	cy	1	30.00	30.00- .....
footing......	cy	3	50.00	35.00- 60.00
wall........	cy	2	52.00	49.00- 55.00
appr slab....	cy	2	51.50	33.00- 70.00
Reinf steel...............	lb	3	0.135	0.115- 0.152
Steel, struct carbon......	lb	3	0.34	0.221- 0.50
Stone masonry facing....	cf	2	9.13	5.50- 12.77
Steel railing..............	lf	1	25.00	25.00- .....

Sewer Items

Items	Unit	No. Jobs	Avg.	Range
Excavation, uncl.........	cy	2	8.00	6.00- 10.00
RCSP, 15"...............	lf	3	14.16	6.00- 25.00
Standard basin..........	ea	3	428.30	410.00-450.00
Subgrade gravel.........	t	3	7.83	7.50- 8.00
Bracing lumber..........	Mbf	2	80.00	25.00-135.00

Prices for 1st half of 1959 were published in ENR: 11-5-59

Alternates Priced for Water Treatment Plant

In the base bidding for these additions to the Shelby, Ohio, water treatment plant, both Walker and Permutit flocculation and settling tanks, and steel reinforcement alternates were priced. Floyd G. Browne & Associates, Marion, Ohio, is the consultant.

The award to Focht Bros., Tiffin, Ohio, was on the Permutit tanks, for which the city is paying a premium of $4,200. Webrib steel reinforcement, 103 tons at $380 a ton, was selected in preference to 147 tons of other steel reinforcement at $265 a ton. Focht's base bid of $557,842 was reduced by the substitution of metering rate controller equipment furnished by Bailey Meter Co., at a saving of $4,000 over base bid equipment, bringing the award to $553,842 (8.5% under the engineer's estimate.)

Cast iron pipe, fittings and wall castings, and steel pipe, were priced by the ton.

Prevailing wages include: plumbers, $3.85; millwrights, $3.55; common laborers, $2.525.

The bidding included:

1C	Focht Bros. Inc., Tiffin, O..................	$553,842*
2	Bay Constr., Inc., Sandusky, O..............	570,308*
14	Shurman Constr. Co., Huntington, W. Va.....	685,244*
EE	Floyd G. Browne & Asso., Marion, O........	605,722

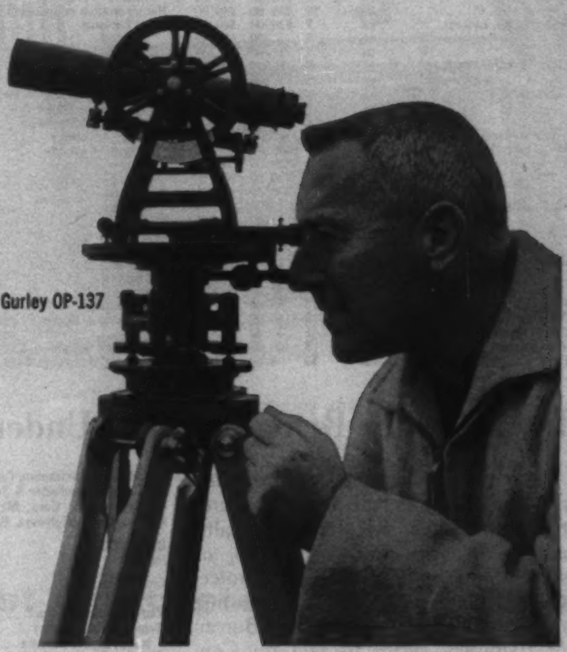
* On Permutit flocculation & settling tank alternate, & metering rate controller equip. by Bailey Meter Co.

Bids: 12-2-59 Items	Unit	Quantity	Unit Prices 1C	2
Excavation, earth.........	cy	10,000	$3.00	$3.75
Foundation cushion.......	cy	120	5.00	6.00
Concrete, class A.........	cy	623	65.00	60.00
class B.........	cy	1,110	60.00	60.00
class C.........	cy	10	50.00	50.00
Portland cement, additional	bbl	20	7.00	.10
Steel reinforcement.......	t	147	265.00	260.00
alt. Webrib............	t	103	380.00	350.00
Shtg & timber left in place.	Mfbm	10	100.00	200.00
Steel sheet piling.........	t	6	250.00	290.00
CIP, mechanical joint.....	t	85	320.00	230.00
fittings............	t	20	650.00	650.00
flanged............	t	8	530.00	475.00
fittings............	t	10	720.00	750.00

(Continued on p. 134)

Built-in optical plummets eliminate plumb bobs save set-up time...improve accuracy

Gurley OP-57



Gurley OP-137

The Gurley Optical Plummet Transit (Model OP-57) has proved itself to be such an important time and money saver in the field that this optical plummet feature has also been added to the Model 132 Standard Precise Transit. The new transit will be known as the OP-137.

Both these Optical Plummet Transits will save you time and trouble in setting over a point. The OP-57 and OP-137 eliminate the swing and sway of the cord and plummet—exasperating and time consuming. You will especially appreciate the increased accuracy on windy locations.

By rotating the instrument 180°, you can be assured of positive centering.

The Gurley Optical Plummet Transits are furnished with tripods which have built-in shifting heads. They allow a two-inch shift of instrument over the point, providing greater latitude in initial set-up.

Model OP-57 is recommended for very exacting work; the OP-137 for general engineering and construction work because of its shorter telescope, smaller size and its lighter weight.

Now in *two* models Gurley offers you an important advantage of the optical-reading theodolite *plus* the simplicity, ruggedness and proved performance of the American transit. *Write for new Bulletin OP-100.*

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Please send new bulletin OP-100 with details on Gurley's Optical Plummet Transits.

NAME

TITLE

ORGANIZATION

ADDRESS

CITY ZONE NO. STATE

CIRCLE 133 ON READER SERVICE CARD

. . . Alternates priced for water treatment plant

Bids: 12-2-59 Items	Unit	Quantity	Unit Prices 1C	2
Cast iron wall castings	t	10	$800.00	$900.00
Vit sewer pipe, 12"	lf	100	4.00	4.00
Iron & copper pipe,				
1" & less	lf	210	2.00	2.00
1¼" & less	lf	50	2.50	2.50
2"	lf	130	3.00	3.00
3"	lf	150	4.00	4.50
Cor metal pipe, 6"	lf	110	2.50	3.00
8"	lf	30	3.20	3.50
Steel pipe	t	6.2	1,600	1,500
Gate valves, 2"	ea	6	50.00	45.00
4"	ea	2	80.00	80.00
6"	ea	5	110.00	115.06
10"	ea	1	250.00	280.00
12"	ea	5	300.00	390.00
Check vlv, lever & wt, 6"	ea	2	170.00	170.00
tilting disc, 14"	ea	1	900.00	950.00
automatic, 8"	ea	2	1,700	1,700
Plug vlv, hyd cyl, 3"	ea	5	350.00	220.00
lever, 4"	ea	3	120.00	100.00
worm gear, 6"	ea	10	230.00	240.00
Butterfly vlv, hyd cyl, 8"	ea	2	630.00	560.00
16"	ea	3	1,100	1,000
18"	ea	1	1,200	1,150
gear & handwheel, 16"	ea	4	1,000	800.00
or chain, 20"	ea	2	1,100	1,100
submrgd, gear & nut, 16"	ea	3	1,000	1,100
18"	ea	1	1,050	1,100
16"	ea	1	1,050	1,200
gear & handwheel, 16"	ea	1	1,000	1,100
Slide gate, 12" round	ea	1	550.00	500.00
12x18"	ea	1	320.00	250.00
16" round	ea	2	630.00	600.00
18x18"	ea	2	500.00	450.00
Sluice gate, 24" round	ea	2	1,400	1,400
24x24"	ea	1	1,400	1,350
Slide gate, 24x30"	ea	2	400.00	275.00
30x30"	ea	1	720.00	600.00
Sluice gate, 30" round	ea	1	1,800	1,750
20" round	ea	1	700.00	600.00
24" round	ea	1	760.00	690.00
Vlv box & cover, adjust	ea	14	40.00	25.00
CIP ftgs, vlvs, etc, remove	t	5	150.00	120.00
CIP & ftgs, instal salvaged	t	1	250.00	200.00
Yard inlets	ea	3	400.00	250.00
Floor grating	sf	90	6.00	7.00
Iron pipe railing	lf	90	6.00	6.00
Misc cast iron	lb	1,900	0.40	0.33
wrought iron & steel	lb	8,650	0.50	0.44
Misc woodwork	Mfbm	0.3	500.00	1,000
Yard hydrant	ea	1	150.00	150.00
Manholes	lf	32	40.00	40.00
Demolition	ls	job	1,000	8,000
Buildings, chemical	ls	job	30,000	39,000
main	ls	job	10,000	14,000
high service	ls	job	1,000	2,000
superstructure,				
lime slurry pump bldg.	lf	job	3,800	3,500
recarbonation bldg	lf	job	1,300	1,200
Plumbing	ls	job	6,700	8,100
Heating	ls	job	5,800	6,000
Electrical	ls	job	27,700	27,000
Flocc & settling tanks,				
Walker	ls	job	22,400	21,500
alt. Permutit	ls	job	26,600	31,000
repair existing	ls	job	1,000	1,700
Recarbonation equipment	ls	job	14,100	12,000
Filter bottoms	sf	456	5.20	5.00
sand	cy	45	16.00	40.00
gravel	cy	27	25.00	50.00
Equipment, surface wash	ls	job	3,400	2,700
chemical handling	ls	job	19,500	17,500
metering rate control, etc.	ls	job	41,000	37,000
alt. Bailey Meter Co.	ls	job	37,000	33,000
Vacuum priming system	ls	job	1,500	1,450
Pumps, lime slurry	ea	2	1,600	1,500
high service	ea	2	4,400	5,500
wash water	ls	1	4,200	5,500
Chemical feeders	ls	job	20,000	20,500
Rapid mix unit	ls	job	3,600	3,900
Septic tank	ls	job	300.00	300.00
Painting	ls	job	7,000	6,000
Embankment	cy	650	1.50	1.00
Pavement	sy	600	4.00	6.00
Sidewalk	sf	800	0.50	0.60
Loam	cy	1,100	1.50	1.00
Seeding	ac	1.5	750.00	1,500
Sterilization	ls	job	500.00	500.00
Jack truck & skid platform	ls	job	1,200	1,400

Completion schedule: 330 cal days.
Liquidated damages: $100/day.

Deck Girder Bridge Is 16% Under Estimate

The new St. Paul Street Bridge across the proposed Jones Falls Expressway and the Pennsylvania RR tracks in Baltimore, Md., will cost $1,895,180, of which 17½% is for a temporary protective structure and removal of existing narrow bridge. The Baltimore Bureau of Highways' award to McLean Contracting Co., Baltimore, is almost 16% under the engineers estimate.

The 60-ft-wide deck girder bridge will have six unequal spans. Beginning at the south abutment, running north, the spans will be 115.31-92.93-115-119.37-135.43-131.81 ft, for a total length of 709.85 ft. To clear the Expressway and the electrification lines of the railroad, the bridge must have a minimum overhead clearance of 14.53 ft. A temporary bridge will at all times provide access to the railroad station and the U. S. Postoffice parcel post station.

Class A concrete must conform to AASHO standard specifications for highway bridges, and must attain a compressive strength of 3,600 psi at 28 days. Minimum cement content of concrete is 6½ bags per cu yd.

Prevailing wages in Baltimore include: carpenters, $3.575; structural iron worker, $3.975; tractor operator, including bulldozer, $3.75; power crane & shovel operators, $4.15; common laborer, $2.275.

The bidding on this bridge included:

1C	McLean Contracting Co., Baltimore	$1,895,180
2	C. J. Langenfelder & Son, Inc., Baltimore	1,937,783
3	Case Constr. Corp., Mt. Airy, Md.	2,646,140
EE	Bureau of Highways, Baltimore	2,250,000

Bids: 12-30-59 Items	Unit	Quantity	Unit Prices 1C	2
Excavation, uncl	cy	9,700	$8.00	$10.00
borrow	t	600	4.00	4.00
Temp protective struct	ls	job	195,000	140,000
Remov exist masonry	cy	5,800	10.00	15.00
bridge superstructure	ls	job	80,000	120,000
Conc, cl A, piers & abutments below sidewks	cy	3,985	45.00	45.00
cl A, bridge superstruct.	ls	job	120,000	132,000
cl C, subfndns	cy	100	18.00	20.00
Steel reinforcement	lb	672,000	0.13	0.125
Dampproofing	ls	job	1,000	960.00
Structural steel	ls	job	682,000	715,000
Pipe rail & electrification barricade	ls	job	65,000	51,000
Storm water drain system	ls	job	135,000	106,000
Porous backfill	ls	job	4,500	3,300
Maintain traffic	ls	job	170,000	185,000
Steel bearing piles,				
14 BP 73	lf	1,205	9.00	8.25
12 BP 53	lf	1,100	7.00	6.75
Test piles, 14 BP 73	lf	50	12.00	15.00
12 BP 53	lf	60	9.00	10.00
Conc, cl A., appr slabs, & abut sidewalks, parapets & end pilasters	ls	job	10,000	8,100
Asph conc binder course	t	300	10.00	8.40
Sht asph surf course	t	270	13.00	12.60

Commence: 1-25-60 Completion schedule: 450 cal days
Liquidated damages: $300/day

Florida Sewers Laid in Area of High Water Table

To provide sanitary sewers in areas not now serviced, and to replace septic tanks, St. Petersburg, Fla., is spending $119,066 for approximately 18,000 ft of laterals, 9,000 ft of house connections, manholes, and related work. Paul Jorgensen is city engineer.

The award to Mills Pipe Line, Inc., St. Petersburg, is 19% over the engineer's estimate.

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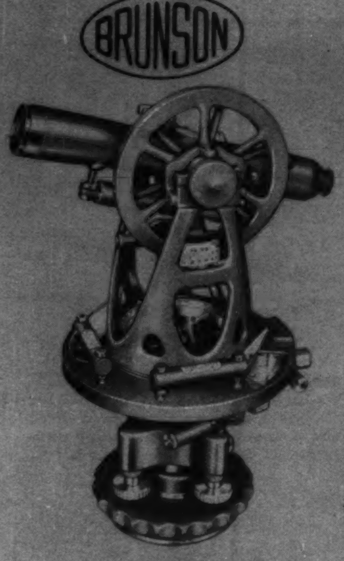

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. . . Florida sewers

Since soil conditions are uniform throughout the city, no test holes will be drilled, the usual practice being to well point and pump, due to high water tables.

The contractor must furnish all of the materials. Only truck transportation is accessible to the site.

Prevailing wages range from a high of $3.55 for skilled, through $1.675 for semi-skilled, to $1.575 for common laborers. Plumbers are paid $3.30.

The bidding on these Florida sewers included:

1C	Mills Pipe Line, Inc., St. Petersburg	$119,086
2	Bumby & Stimson, Inc., Orlando, Fla	125,480
5	E. I. Rutledge, St. Petersburg	140,000
EE	Paul Jorgenson, City Engineer	100,000

Bids: 12-9-59 Items	Unit	Quantity	Unit Prices 1C	Unit Prices 2
VCP, 10", cut, 12–14'	lf	200	$10.50	$9.00
10–12'	lf	150	7.80	7.00
8–10'	lf	600	5.70	5.50
6– 8'	lf	25	4.80	5.00
8", cut, 10–12'	lf	25	7.20	6.50
8–10'	lf	2,025	5.20	5.00
6– 8'	lf	5,675	4.30	4.50
4– 6'	lf	8,850	3.42	4.00
0– 4'	lf	1,100	3.00	3.75
6", cut, 0– 4'	lf	300	2.50	3.50
House service conn, type I	ea	425	9.00	6.25
type II	ea	300	9.00	20.00
VCP riser, 6", for house serv connection type II	lf	600	1.50	1.25
type I & II, extensions	lf	8,500	1.50	1.50
Cleanouts, 6"	ea	5	40.00	60.00
Stone bed	cy	20	8.00	9.00
Timber supports	bf	2,000	10.00	300.00
Concrete encasement	cy	10	30.00	50.00
pipe support at ditch xings	cy	1	70.00	75.00
Manhole base slab, 8"	sf	1,800	1.10	1.75
12"	sf	100	1.50	2.25
Brick for manholes	ea	56,000	115.00	130.00
Manhole ring & cover, 11"	ea	50	43.00	50.00
5"	ea	7	33.00	44.50
Drop inlets, 8"	ea	6	65.00	50.00
CIP substitution, 8"	lf	500	2.20	2.50
10"	lf	200	3.30	3.00
RR crossing, extra work	ls	job	3,000	6,500
Compaction	lf	4,000	0.12	0.07
Shell base	sy	150	1.30	2.25
Limerock base	sy	125	2.00	2.75
Single surface treatment	sy	300	3.00	3.00
Double surface treatment	sy	300	3.25	3.50
Asph conc surf crse, type II	sy	75	3.60	1.25
type I	sy	75	3.50	1.00
Relay brick pavement with sand filler	sy	150	5.00	3.50
asphalt filler	sy	150	6.00	4.00
Shell surface	cy	110	2.75	4.00
Concrete gutter	lf	50	2.00	2.00
curb	lf	50	1.50	1.50
Reset stn or precast curb	lf	50	1.00	1.00
Sidewalk	sf	100	0.50	1.00
Resod parkways	sf	1,000	0.15	0.15
Sprig or reseed parkways	sf	100	0.05	0.10
Concrete driveways	sf	25	0.60	1.10
Double surface driveways	sy	10	3.00	3.50
Pea gravel driveways	sy	10	4.00	3.50

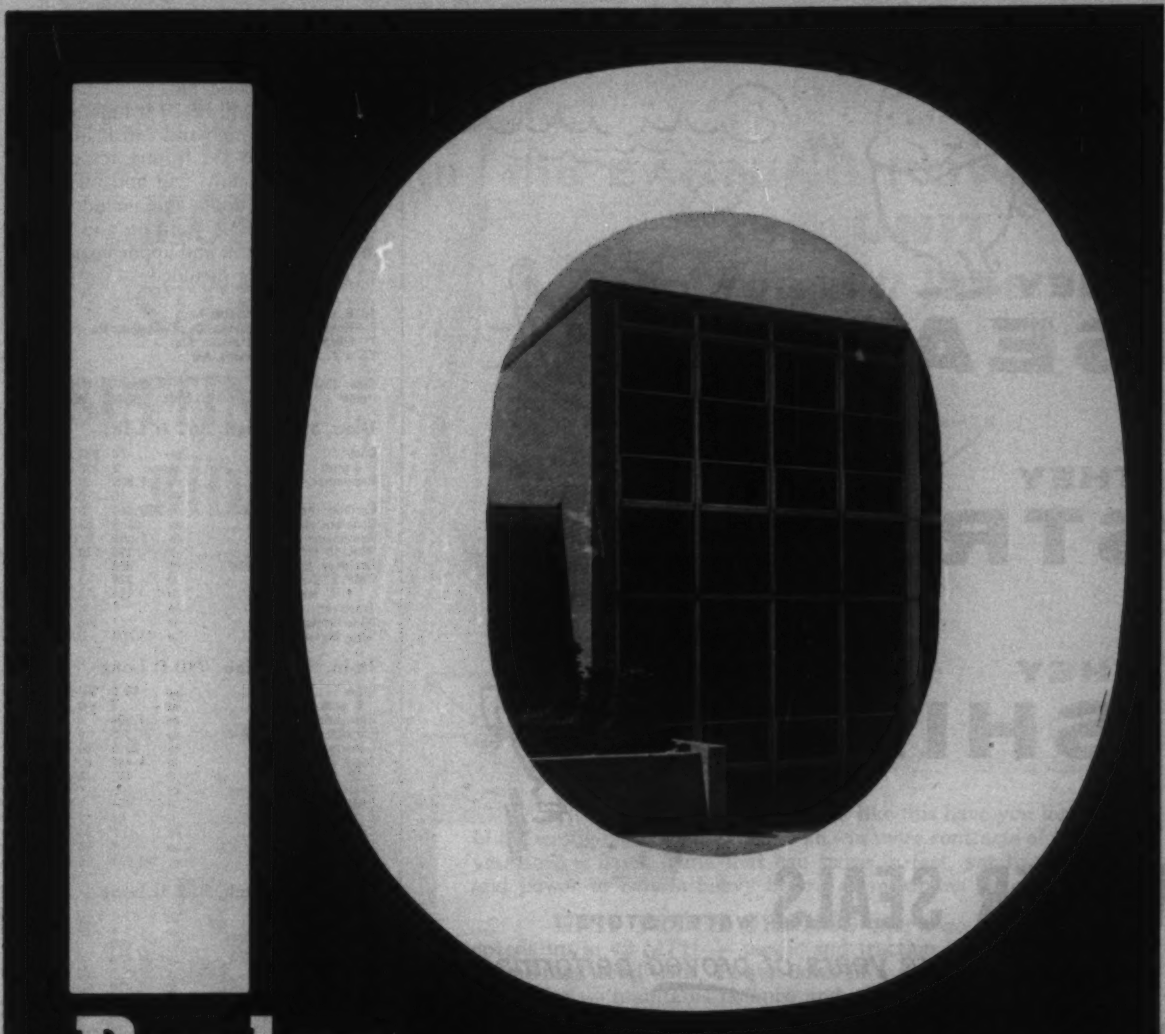
Commence: 60 days.

Compacted Earthfill Takes 57% of Dam Contract

Compacted earthfill, 185,269 cu yd at 25 cents a yd, accounts for 57% of this $81,949 contract for construction of three watershed protection, flood prevention and municipal water supply dams at the High Pine Creek Watershed near Roanoke, Ala. J. F. Pruitt, Dadeville, Ala., is the engineer.

The Board of Commissioners for Randolph County, Wedowee, Ala., awarded the contract to E. O. Nolen, LaFayette, Ala., on a low bid 15%

(*Continued on p. 138*)



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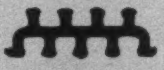
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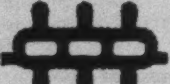
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. . . Earthfill dams

under the engineer's estimate and 16% below the second bid.

The dams will be 39 ft high and 567 ft long; 38 ft high and 740 ft long; and 55 ft high and 352 ft long, respectively.

Work is mainly "cut and fill" under average conditions, and includes clearing, compaction, drainage and piping, and related work and appurtenances.

The bidding included:

1C	E. O. Nolen, LaFayette, Ala.	$ 81,949
2	Russell Engr. & Constr. Co., Columbus, Ga.	97,475
7	Gilchrist & Son, Decatur, Ala.	130,222
EE	J. F. Pruitt, Dadeville, Ala.	96,363

Bids: 11-16-59

Items	Unit	Quantity	Unit Prices 1C	2
Dam, 39 ft High, 567 ft Long				
Clear	ac	17	$90.00	$110.00
& grub	ac	2	130.00	150.00
Excavation, common	cy	1,868	0.40	0.39
rock	cy	10	0.80	5.00
Earthfill, compacted B-2	cy	65,964	0.25	0.30
Concrete, class B	cy	22.5	60.00	60.00
Reinforcing steel	lb	1,689	0.135	0.14
RCP, 15–16"	lf	219	10.95	10.50
Drainage, filter material	cy	369	6.00	6.00
CMP, 8" perf	lf	326	2.18	3.00
8" unperf	lf	104	2.12	3.00
Trash rack	ea	1	55.00	425.00
Slide headgate	ea	1	106.15	100.00
Sprig Bermuda	sy	13,000	0.05	0.05
Dam, 38 ft High, 740 ft Long				
Clear	ac	14.5	$90.00	$110.00
& grub	ac	3	130.00	150.00
Excavation, common	cy	4,800	0.40	0.39
Earthfill, compacted B-2	cy	74,300	0.25	0.29
Concrete, class B	cy	20.5	60.00	60.00
Steel, reinforcing	lb	1,445	0.135	0.14
RCP, 15–16"	lf	197	10.95	10.50
Drainage, filter material	cy	360	6.00	6.00
CMP, 8" perf	lf	354	2.18	3.00
8" unperf	lf	50	2.12	3.00
Trash rack	ea	1	55.00	425.00
Slide headgate	ea	1	96.12	100.00
Sprig Bermuda	sy	20,650	0.05	0.05
Dam, 55 ft High, 352 ft Long				
Clear	ac	37.4	$ 90.00	$110.00
& grub	ac	1.5	130.00	200.00
Excavation, common	cy	1,890	0.40	0.45
Earthfill, compacted B-2	cy	46,005	0.25	0.34
Concrete, class B	cy	30.8	60.00	62.50
Steel, reinf	lb	2,790	0.135	0.14
RCP, 18"	lf	304	11.37	12.50
Drainage, filter matl	cy	166	6.00	6.00
CMP 8" perf	lf	70	2.18	4.00
8" unperf	lf	70	2.12	4.00
Trash rack	ea	1	55.00	425.00
Slide headgate	ea	1	243.38	250.00
Sprig Bermuda	sy	11,000	0.05	0.05
Asb cmt pipe, 12"	lf	163	5.00	6.00
Gate vlv w trash guard	ea	4	195.00	400.00

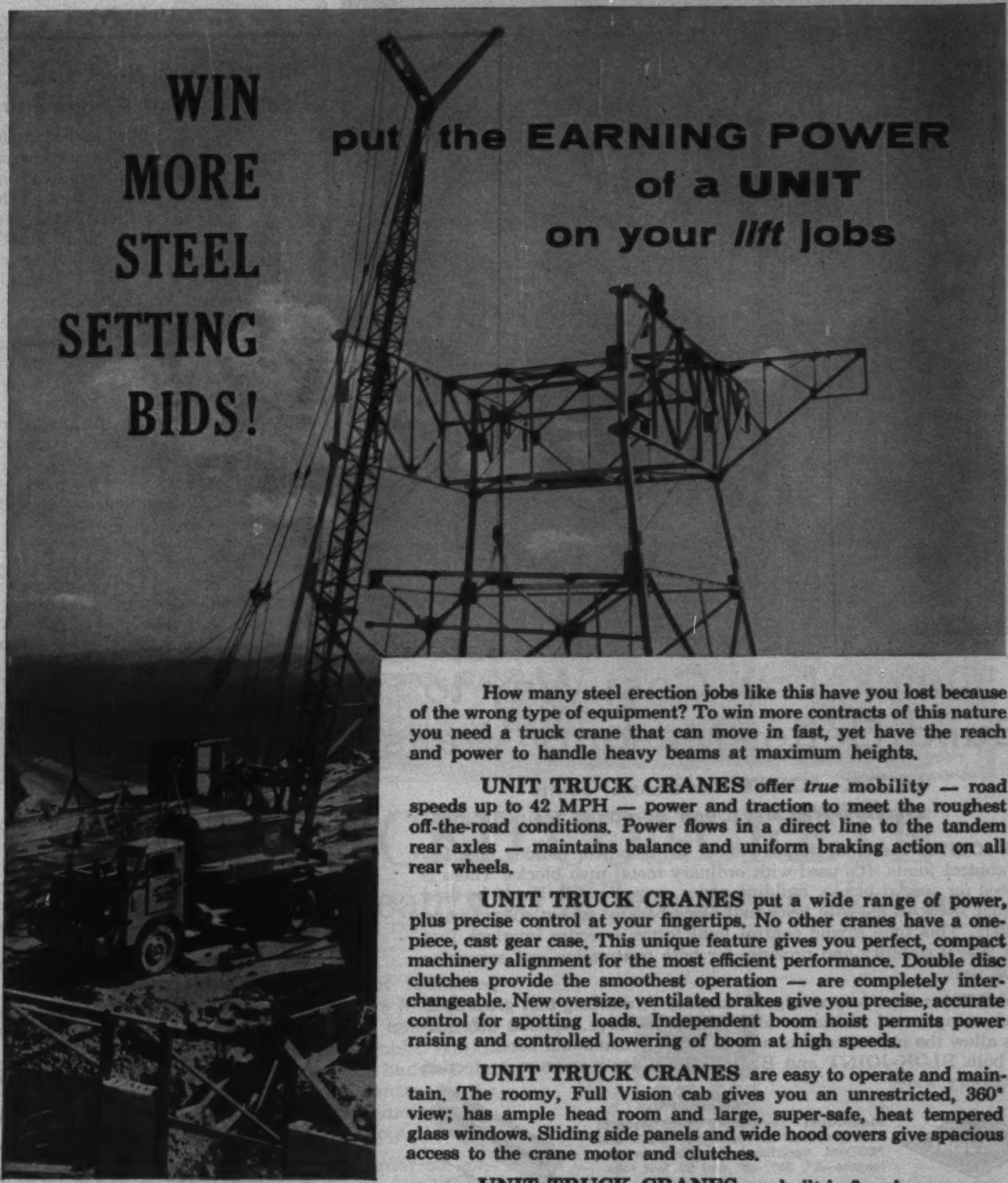
Completion schedule: 270 cal days
Liquidated damages: $30 / day

Contractor Favors Bids on Mobilization of Equipment

Unbalancing of bids could be cut down if the schedule of quantities bid on each project carried an additional separate item for "mobilization of equipment," suggested Mr. P. Miller, president of Mohawk Constructors, Inc., Linden, N. J., speaking before a February meeting of the Metropolitan-New York Section of the American Association of Cost Engineers.

Mr. Miller favors unit price bidding as opposed to lump sum bidding, particularly on subsurface and foundation work. Accurate soil classification and quantity take-off for conditions to be expected, would further improve bidding, pricing and performance.

(*Unit Prices continued p. 140*)



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This 20 ton UNIT Model 1520T truck crane is setting steel for a power line atop Mt. Frances in Utah.

How many steel erection jobs like this have you lost because of the wrong type of equipment? To win more contracts of this nature you need a truck crane that can move in fast, yet have the reach and power to handle heavy beams at maximum heights.

UNIT TRUCK CRANES offer *true* mobility — road speeds up to 42 MPH — power and traction to meet the roughest off-the-road conditions. Power flows in a direct line to the tandem rear axles — maintains balance and uniform braking action on all rear wheels.

UNIT TRUCK CRANES put a wide range of power, plus precise control at your fingertips. No other cranes have a one-piece, cast gear case. This unique feature gives you perfect, compact machinery alignment for the most efficient performance. Double disc clutches provide the smoothest operation — are completely interchangeable. New oversize, ventilated brakes give you precise, accurate control for spotting loads. Independent boom hoist permits power raising and controlled lowering of boom at high speeds.

UNIT TRUCK CRANES are easy to operate and maintain. The roomy, Full Vision cab gives you an unrestricted, 360° view; has ample head room and large, super-safe, heat tempered glass windows. Sliding side panels and wide hood covers give spacious access to the crane motor and clutches.

UNIT TRUCK CRANES are built in five size ranges — 10, 15, 20, 30, and 35-40 tons — to handle most any lift job. Convertibility to all excavator applications brings you a plus value. Your UNIT dealer has full information on every model — and the famous UNIT crawler-mounted machines, too. Call him soon.

SHOVELS	½ to ¾ YDS.
HOES	½ to ¾ YDS.
CRANES	5½ to 40 TONS
DRAGLINES	½ to ¾ YDS.

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BLOK-MESH is the "deep swedged" masonry reinforcing that gives additional strength and resistance to cracking. Its large, squared deformations allow the mortar to take a deep grip for maximum bond.
Use both BLOK-JOINT and BLOK-MESH for maximum protection of masonry walls.

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BLOK-JOINT For Control Joints Made of "100 year life" rubber to meet ASTM and FEDERAL specifications. Comes in four lengths—8", 24", 48" and 50 foot rolls.

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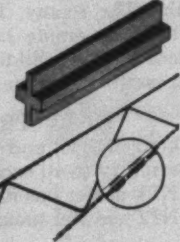

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West German Steel Takes Panama Canal Bridge Job

Foreign steel competed in the bidding with domestic steel for the superstructure of a fixed bridge over the Panama Canal at Balboa, Canal Zone. The Panama Canal Co. awarded the contract at $9,119,000 to John F. Beasley Construction Co., Dallas, bidding on West German steel (ENR Feb. 10, p. 22). United States Steel Export Co., New York City, pricing domestic steel, was only 8% over this figure. Sverdrup & Parcel Engineering Co., St. Louis is the consultant.

The contract was broken down into three parts: base bid structural steel, and two additive alternates. Beasley's base bid of $7,770,000 on the German structural steel was 18.2% under his own 9,500,000 base bid on domestic steel. It was almost 11% under United States Steel Export Co.'s low base bid of $8,727,000 on domestic steel, and 28.5% under the $10,860,000 engineers estimate on domestic steel. Beasley was the only bidder pricing both domestic and foreign steel. Two bidders priced foreign steel and six domestic.

Center bridge spans are 1,128 ft. long; side spans, two cantilevers at 557.5 ft each. Height above mean high water is 201 ft clear. Approaches consist of nine truss spans and two girder spans. Total distance, back to back of abutment backwalls, is 5,425 ft.

The canal channel must be kept clear at all time, with no falsework permitted. Permission for use of the channel for transportation and lifting in place of the bridge structural elements must be obtained from the contracting officer, who will also specify what navigation lights the contractor must install on his temporary work.

Bids Based on Use of Non-Domestic Steel

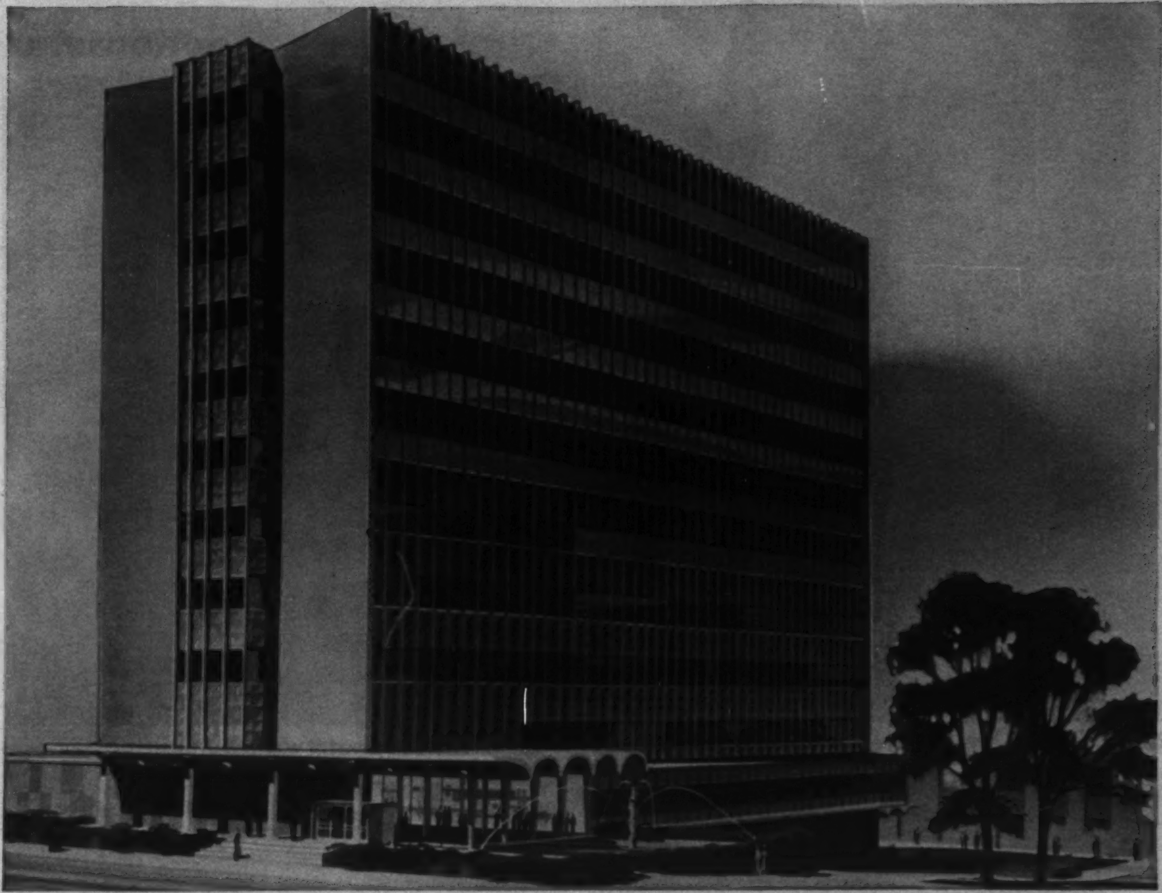
1C	John F. Beasley, Dallas, Tex.	$9,119,000
2	Fruin Colnan International, S.A., Kansas City Bridge Co. and LeBoeuf & Dougherty, Inc., Balboa, Canal Zone, a jt. venture	9,459,733
3	C. H. Leavell Co., El Paso, Tex.	10,459,226

Bids Based on Use of Domestic Steel

1	U. S. Steel Export Co., N.Y.C.	$9,861,000
2	Allied Struct, Steel Cos. Midland Struct. Steel Corp., Chicago	10,368,000
7	Strupo Bros., Bridge & Iron Co., St. Louis, and Yuba Consol. Indus., Inc., San Francisco, a joint venture	14,875,797
EE	Panama Canal Co., Canal Zone, and Sverdrup & Parcel Engineering Co., St. Louis	12,089,560

Bids: 12-2-59 Items	Unit	Quantity	Unit Prices 1C Foreign Steel	1 Domestic Steel
Base bid: Structural steel	ls	job	$7,770,000	$8,727,000
Additive Alt. A:				
concrete deck	ls	job	777,000	561,000
aluminum handrail	ls	job	65,000	76,100
field painting	ls	job	190,000	197,000
embedded conduits	ls	job	11,000	12,900
Additive Alt. B:				
lighting systems	ls	job	75,000	53,000
pwr & comm conduits	ls	job	155,000	178,700
substation bldg	ls	job	5,000	5,100
maintenance air line	ls	job	30,000	22,500
fire protection system	ls	job	41,000	27,700

Completion schedule: 900 cal days
Liquidated damages: $500/day



REINFORCED CONCRETE

adds additional beauty to Milwaukee's skyline

Another outstanding example of reinforced concrete design flexibility is the new Milwaukee Municipal Building and Garage, housing the city's Health Department and Public Works. In the construction of this modern building, the architects were able to take advantage of the variations in street grades to provide two parking levels below the first floor offices.

For buildings large or small, reinforced concrete provides maximum design freedom to meet the unusual or specialized demands of terrain and occupancy. Before you build, investigate this more flexible method of construction and enjoy the added advantages of speed and economy.

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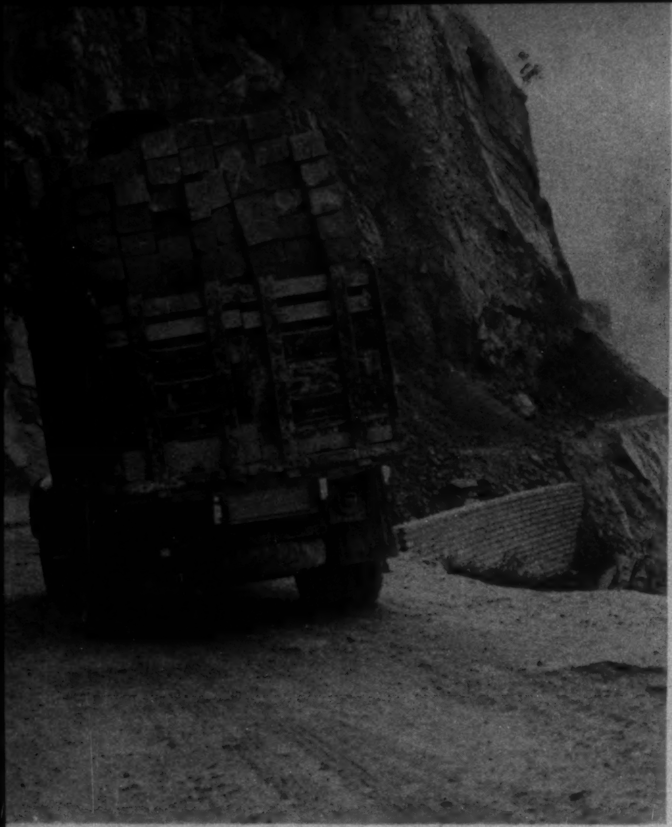
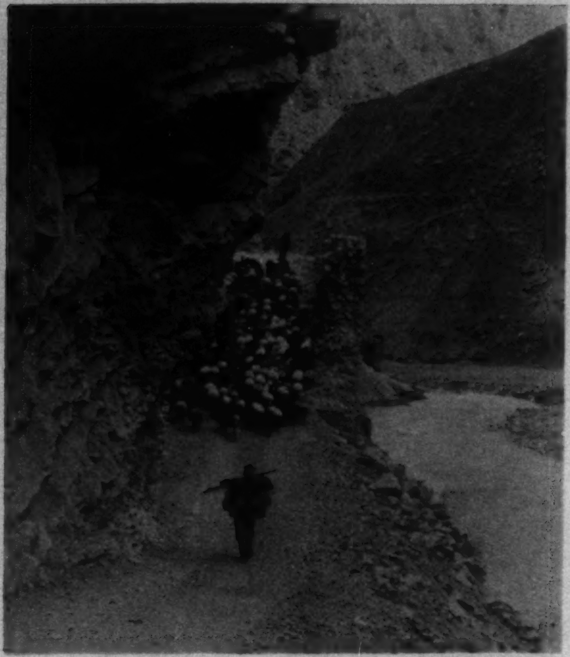
City of Milwaukee Municipal Building and Garage
Milwaukee, Wisconsin
Architects: Eschweiler & Eschweiler, Milwaukee
General Contractor: Siesel Construction Company, Milwaukee

2-60



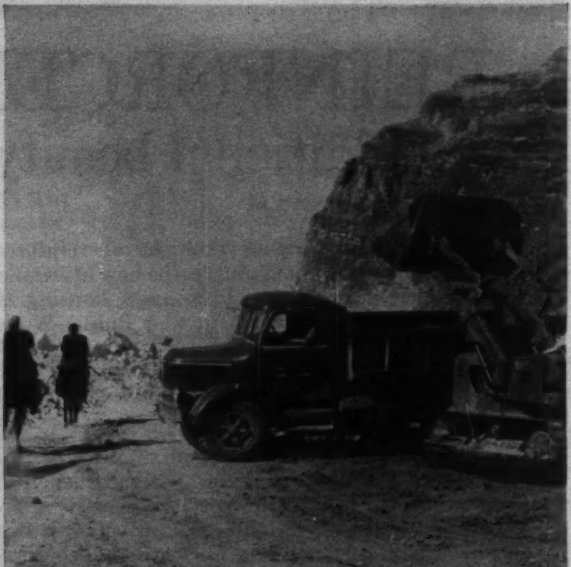
Roads broken down by overloaded trucks . . .



and narrow, rock-strewn mountain passes . . .

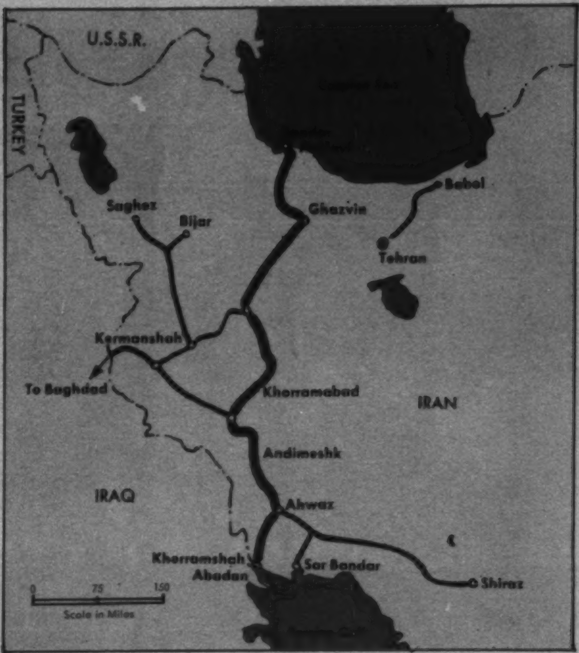
Roads Have

Rugged country demands many high fills.



Mountainsides are cut to widen curves.

must carry food to Iran's inland towns.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IRAQ
Ahwaz
Khorramshah
Abadan
Sar Bandar
Shiraz
0
75
150
Scale in Miles

These new roads will aid Iran's economy.

Key Role in Iran's Development

When the World Bank agreed to loan Iran $72 million last summer to put more speed into a lagging road program, it laid the groundwork for a series of construction projects now getting under way in the desert and mountain terrain of that underdeveloped country.

Specifically, the work involves rebuilding 1,530 miles of roads in the western part of the country to modern standards of width and load capacity. The road program is to be completed in three years.

Also located in this part of the country are the bulk of the hydro power projects, industrial developments and municipal improvements that constitute the current Seven Year program of Iran's Plan Organization (ENR Sept. 25, 1958, p. 50).

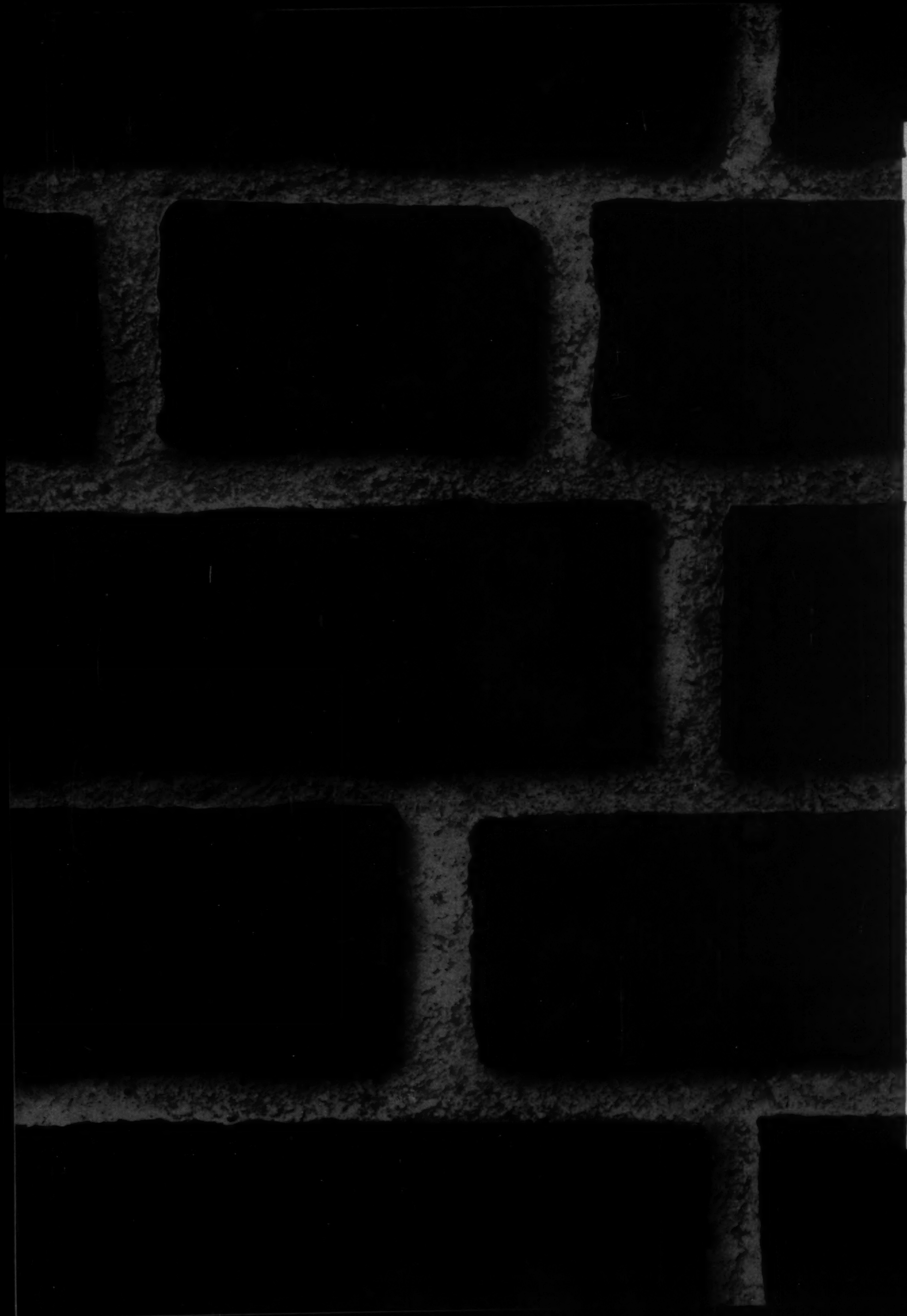
Funds for the $72-million load are being provided jointly by the World Bank and by four private American banks.

The private banks will supply a total of $12 million. These funds will be used largely to cover foreign exchange requirements. The remainder of the $185 million required for the entire road program being supplied by the Plan Organization from its share of Iran's oil revenues.

Inadequate transportation has long

(*Continued p. 146*)

Blacktop roads are the rule in oil-rich Iran.



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A Sonneborn development, HYDROCIDE S-X HYCON is *far more effective and much longer lasting under the severest conditions than any silicone water repellent previously available.* Its superior formulation is derived from Sonneborn's use of the Hycon Silicone molecule that develops a tighter grip on the masonry surface. Hence these superior qualities:

1. LONG LASTING . . . DEEP PENETRATION . . . POSITIVE PROTECTION . . . Tests prove that a single application provides complete treatment and immediate water repellency on most masonry surfaces for a much longer period of time than any previous water repellent.

2. EASY TO APPLY ALL YEAR ROUND . . . HYDROCIDE S-X HYCON because of its superior quality is easy and fast to apply by brush or spray all year round. Where subsequent painting of the masonry is desired it can be easily painted over and does not interfere with the bond of oil base paints.

3. PROTECTS AGAINST DIRT AND EFFLORESCENCE . . . HYDROCIDE S-X HYCON helps preserve the original appearance of exterior walls by excluding atmospheric moisture and minimizing the adhesion of air-borne dirt which stain or darken most surfaces; and helps reduce the possibility of surface salt deposits, spalling and cracking of masonry caused by freezing and thawing.

4. PERMITS "BREATHING" . . . HYDROCIDE S-X HYCON permits masonry to "breathe" since it does not plug or smother the masonry pores. It simply imparts long-term water repellency to the *inner surface of these pores.* Result: Moisture in the liquid phase cannot enter, yet moisture in the wall can easily escape or "breathe" out as water vapor.

5. INSURES DURABILITY OF INTERIOR FINISHES HYDROCIDE S-X HYCON applied to the exterior wall surface minimizes risks of moisture moving through the wall to the interior face. Damages to the interior wall surface such as dampness, peeling of wall paper, blistering of paint and unsightly efflorescence are thereby reduced.

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been a major handicap to developing Iran. Iran is twice as large as Texas. Eighty percent of the population is engaged in agriculture in widely scattered locations with poor transportation to towns where produce can be sold.

The new roads will improve this situation as well as aid in the execution of the Seven Year Plan development projects and in fostering the growth of private industry.

An important corollary of the road program has been the passage of a law to control the weight of trucks. Overloaded trucks have been the principal cause of deterioration of roads. Owners of the trucks weld the springs together and carry loads of 30 to 40 tons.

One road that suffered this fate is the 750-mile north-south Trans-Iranian Highway, which was greatly improved by American engineers during World War II. It was used to carry supplies to Russia from Khorramshahr on the Persian Gulf to Pahlavi on the Caspian Sea (see map). This road is one of the principal units in the new network. The design of the middle 375 mile portion, largely in mountainous territory, is being done by Ammann & Whitney, New York City consultants. West German and Italian firms will handle the sections at the north and south ends.

"We're trying not to overdesign the road, but to give Iran as much road for the money as possible," says Alfred Best, A&W associate in charge of overseas projects.

"The geometry of the road isn't hard and fast, because it's geared to the economics," says Mr. Best. "There isn't a big budget—our road costs about $80,000 a mile—so we build the best we can now and it can be improved later. Some of the grades are 10%—this is like the U. S. 40 years ago.

"Intelligent supervision permits a lot of savings through field adjustments. For instance in the mountains many places need retaining walls. Someone has to decide whether it's cheaper to take down a mountain or build the road over a ravine.

"One of the big problems in Iran is the lack of equipment, especially crushers. We don't allow contractors to use hand-split, hand-placed rock in the base course on our section. The irregular stones roll and the paving breaks up."

The position of the consultant is very firm in Iran, according to Mr. Best. The government relies on his advice completely because there is no technical bureau there. Almost all contractors on the project are local companies and they have proved reliable.

Other roads in the network financed by the loan are:

HAND-LAID STONE, common in Iran, is not permitted by Ammann & Whitney.

The 235 mile road running west from Hamadan to the Iraq border will be used primarily for the exchange of goods between the agricultural area around Kermanshah and the capital city of Teheran.

The road from Malavi through Kermanshah and north to Saghez will shorten the trucking distance between the Gulf ports and Tabriz by 155 miles.

The new road between Sar Bandar and Ahwaz will permit goods from the port of Bandar Shahpur, near Sar Bandar, to be moved more readily than present inadequate rail facilities permit.

The Shiraz-Khalfabad road will give the important Shiraz region an outlet to the south port cities, whereas almost all present movements of goods are northward toward Isfahan.

The sixth road in the program, somewhat separate from the main net, will provide better transportation into Teheran from that city's principal vegetable supply region up near the Caspian Sea. It will run for 62 miles between the towns of Rudehen and Babol.

Unusual Suspension Bridge Will Span Tagus at Lisbon

A Portuguese company with foreign backing filed the low bid, $45.5 million, for construction of a suspension bridge over the Tagus River at Lisbon.

The low bidding company, Sociedad Atlantico Portuguese de Empreesamentos y Expanso Economica, proposes to erect a suspension bridge with cables radiating out from towers, instead of the conventional suspension structure.

The new Tagus bridge must have a minimum altitude of 230 ft over the water at mid-river. Total length will be about 6,560 ft.

British Expressways May Straddle the Rails

A method of expressway construction that eliminates almost entirely the process of route location and the expensive and politically explosive problem of right-of-way acquisition is under consideration by the British Ministry of Transport.

The plan is to build elevated expressways over existing rail lines.

Sir Owen Williams & Partners, London consulting engineers, submitted to the ministry a design for a three-mile stretch of road to be built in this manner near Birmingham.

The cost of this route would be little more than that of a conventional surface road, considering the cost of overpasses, underpasses and expensive retaining walls they involve, say the designers.

The Williams design calls for a 103-ft-wide roadway built 45 ft above track level and supported on two rows of 4.5-ft-dia columns. The firm estimates it would cost about $5.6 million.

The distance between column rows in the design is 66 ft, placing them outside the total width of the rail line's four tracks. Longitudinal beams rest on the columns, supporting precast cross members that carry a poured-in-place deck.

The 45-ft height of the route was chosen to gain self-ventilation and ease of access to the rail lines and to clear existing road bridges over the line. The cost of height for the structure is only about 3% for each ten feet.

Another Space-Saver Is Double-Deck Highway

Britain's Ministry of Transport held an open competition for designs that would contribute towards a solution of urban highway congestion.

Winning entry was a viaduct that uses the same right-of-way as an existing roadway.

It's made up of precast, prestressed, 59-ft I-beams placed on a center beam. The main longitudinal beams are supported by a series of single, 9-ft-wide columns on 60-ft centers.

The columns are built in a center mall 15-ft wide. The only construction that need be done at roadway level is on the foundations, columns and main center beams. Roadway traffic can continue during and after construction.

The viaduct has a capacity of 5,000 vehicles an hour at 50 mph. The Designers, G. K. N. Reinforcements, Ltd., of London, estimate it will cost about $3.5 million per mile to build.

(*International continued p.* 148)

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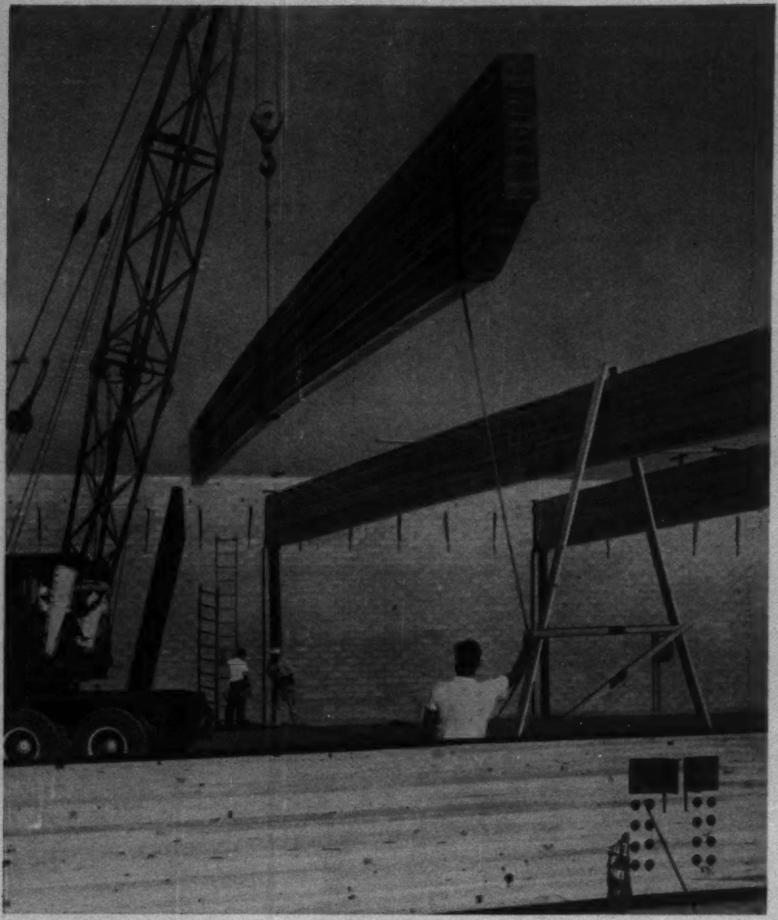

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COMPTON BOWL . . . UP IN JUST 2 DAYS

Utilizing 100′ Fluor-Summerbell laminated wood beams, the roof structure for the 32-lane Compton Bowl, Compton, California, was erected in only two days.

This 181′ x 197′ laminated wood and shell block masonry structure houses a cocktail lounge, coffee shop, dining hall and game room, in addition to the 32 lane bowling alley.

The use of Fluor-Summerbell beams in constructing the Compton Bowl allowed a sizeable reduction in the number of uprights required. In addition, using these exceptionally long-span beams considerably reduced the total number of beams that would ordinarily be needed.

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British Sports Palace Will Include Own Hotel

A $6-million British amateur sports center will be constructed on a 36-acre site of the Crystal Palace area in London, beginning this summer.

The project will include: a sports hall containing three swimming pools and a track; a stadium; and a hotel with accommodations for 138 guests.

The proposed Sports Hall is 285 ft long by 270 ft wide by 65 ft high. Reinforced concrete bents, each formed of four angled columns, will make up the center spine support of the building. These will support tapering steel roof trusses, connected by diagonal steel members and covered with wood-wool slabs and copper sheeting. Exterior walls are reinforced concrete with brick panels.

The crescent-shaped stadium will be partially covered by a welded steel-framed canopy with an aluminum deck. The decking will be 357 ft wide, 72 ft deep and supported by eight welded steel masts with concrete struts. The stadium's reinforced concrete slab will be 920 ft in circumference and will have a maximum width of 28 ft. Seating will be precast concrete step units.

The architect of the National Youth and Sports Center is Hubert Bennett, London County Council Architect. The general contractor has not been named yet.

Elevated Railway to Link Moscow to Nearby Airport

Moscow is planning a 9-mile elevated railway that will link the city's underground rail network with nearby Vnukovo Airport.

Rails will be supported by trestles 20 ft above the ground and will be built to accommodate trains at speeds of up to 100 mph. Reinforced concrete trestles will be spaced at 100-ft intervals. The tracks will be elevated so that other transportation can pass easily underneath.

Stadium for 1962 Asian Games Started at Jakarta

Indonesia's President Sukarno, laid the foundation stone for a Soviet-financed stadium for the 1962 Asian games at Jakarta. The stadium is to be built with a $12.5-million Soviet loan.

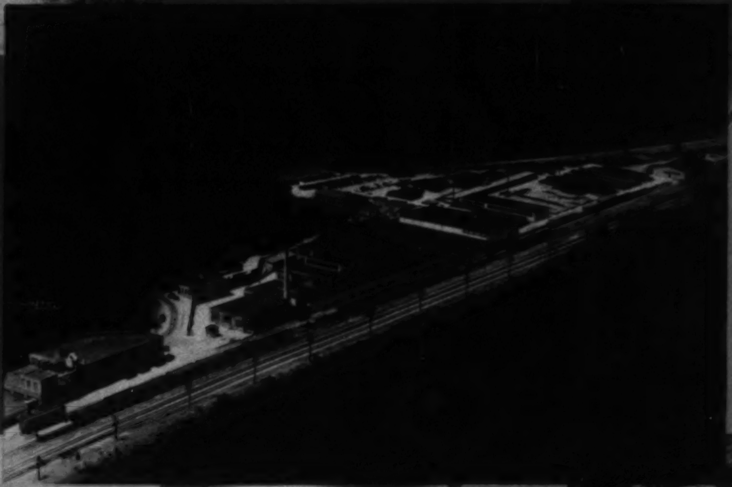
Blueprints for the stadium are in Moscow for final touches. About 100 Russian engineers and technicians are expected in Indonesia shortly to supervise construction.

(*International continued p.* 151)

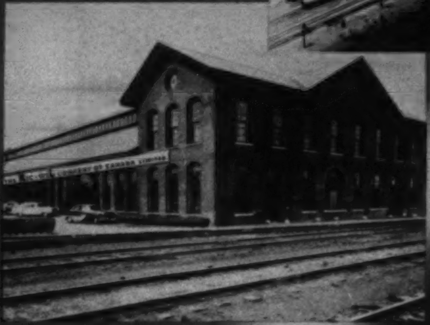
1910 . . . Original Ric-wiL one room building

1928 . . . Two story plant located on Brown Street in Barberton, Ohio

1960 . . . Present plant site in Barberton covers 10½ acres with 11 buildings.



1956 . . . Establishment of Ric-wiL Company of Canada, Ltd. St. Thomas, Ontario



1959 . . . Establishment of Western Ric-wiL Company, Newark, California

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Fifty years of continued growth and expansion is a tribute to the Ric-wiL helically corrugated prefabricated insulated piping systems.* Systems that are engineered in correct basic design and quality built. Each unit, accessory and fitting is entirely prefabricated in factories equipped for this exclusive work. All conduit is pre-tested before delivery to the job site . . . in short . . . a system that offers the greatest strength and thermal efficiency obtainable for distribution piping.

Complete literature is available on the many types of systems . . . it's yours for the asking.

*Covered by U.S. Patents 2330966, RE. 22988, 2378214. Other patents pending.

Quality Piping Systems . . .
. . . of Exceptionally High Thermal Efficiency

RIC-WIL PREFABRICATED INSULATED PIPING SYSTEMS

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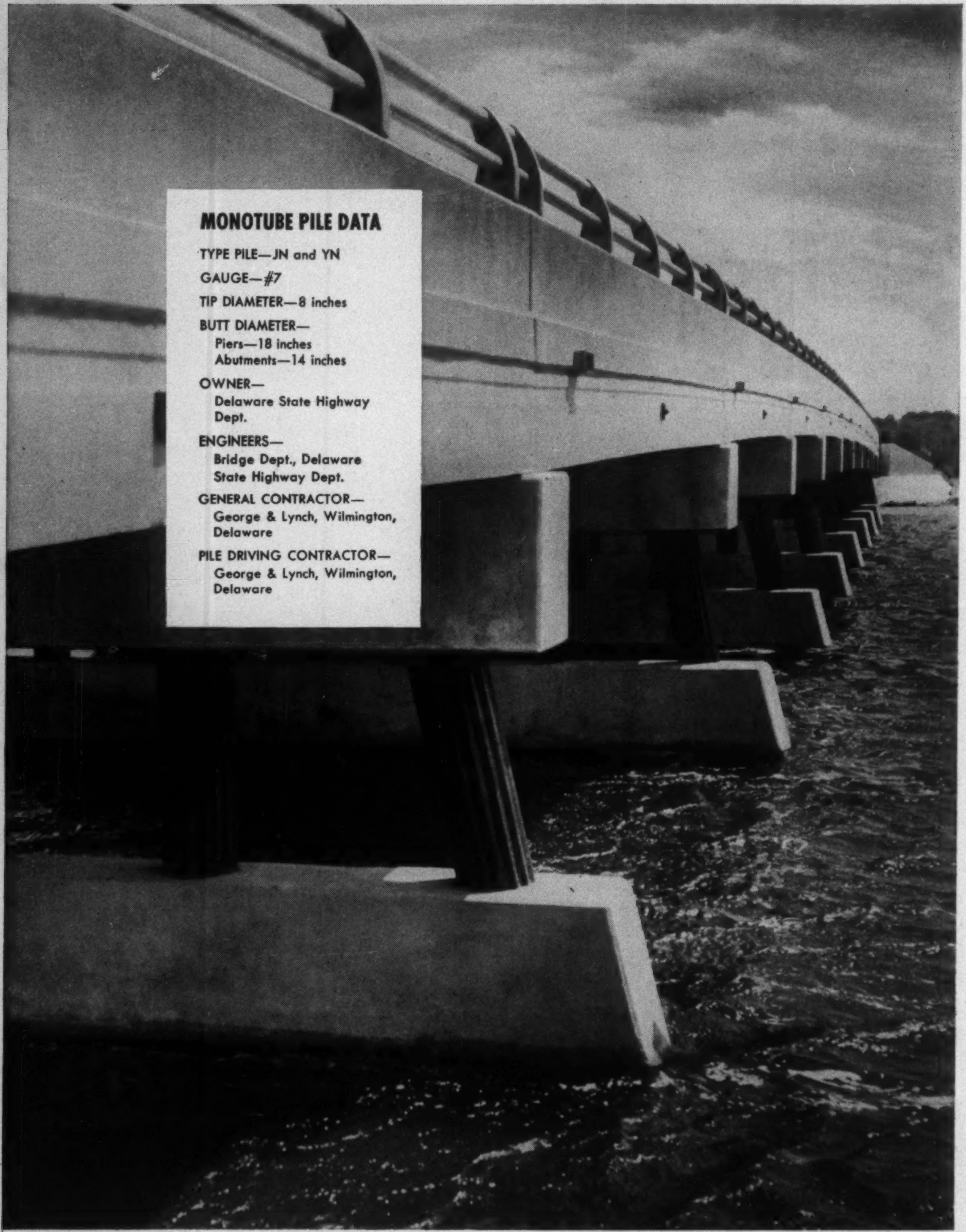
IN CANADA: THE RIC-WIL COMPANY OF CANADA LIMITED



MONOTUBE PILE DATA

TYPE PILE—JN and YN

GAUGE—#7

TIP DIAMETER—8 inches

BUTT DIAMETER—
  Piers—18 inches
  Abutments—14 inches

OWNER—
  Delaware State Highway Dept.

ENGINEERS—
  Bridge Dept., Delaware State Highway Dept.

GENERAL CONTRACTOR—
  George & Lynch, Wilmington, Delaware

PILE DRIVING CONTRACTOR—
  George & Lynch, Wilmington, Delaware

DESIGN ECONOMY AND CONFIDENCE with Monotube Piles . . . acting both as piers and foundations for this prestressed concrete beam bridge at Fenwick Island, Delaware. The high columnar strength of Monotubes makes their application ideal for this type of project.

Tapered, fluted Monotube steel piles are available in lengths, diameters and gauges to meet your requirements. The Union Metal Manufacturing Co., Canton 5, Ohio—Brampton, Ontario, Canada.

UNION METAL

Monotube Foundation Piles

←CIRCLE 150 ON READER SERVICE CARD

Canada Hydro Record

Quebec Province leads in power development

Hydroelectric generating capacity brought into service in Canada during 1959 hit a new record high for the second consecutive year. This is indicated in a year-round report on the Canadian hydro industry, prepared by the Shawinigan Water and Power Co.

Hydro capacity placed in operation during 1959 amounted to some 1,870,000 kw, surpassing by a small margin the previous record of 1,800,000 kw set in 1958. During the next few years installations now under construction or on the drawing boards will provide a further 3,000,000 kw to meet anticipated future demands.

Generating capability, both hydro and thermal, during the past year was up 10% over 1958 to about 21,000,000 kw. A further 10% rise is anticipated during 1960 to increase capability to some 23,000,000 kw.

In the first 10 months of the past year, electric power produced in Canada amounted to nearly 85 billion kilowatt hours, up about 7% over the corresponding period of 1958.

The Province of Quebec, with additions totaling 1,087,500 kw, led the provinces in new hydroelectric capacity installed during the year. Further installations now under construction will add another 1,500,000 kw, about half of which is scheduled to come into operation during 1960 and the remainder later.

The Quebec-Hydro-Electric Commission brought the third and last section of its Beauharnois plant, near Montreal, into initial operation. At the years end four units, each rated at 55,000 kw were in service and the Commission expects to have the remaining seven units in operation by the end of 1960.

With the complete third section on the line Beauharnois will have a total installed capacity of 1,668,000 kw.

The Quebec Hydro-Electric Commission also placed in service the first three 127,500 kw units of its Bersimis I plant. The remaining two units are scheduled to go into operation during this calendar year.

The Commission also made known recently that work was being started on its Carillon development on the lower Ottawa River. The plant will have 14 units each rated at 45,000 kw. Studies are continuing on the Lachine Rapids section of the St. Lawrence River near Montreal.

(*International continued p. 154*)

miller

FIVE IN ONE FIREBALL

Other Miller welders in this series include:

DA-300-L BIG RIG
Four-in-One:
AC arc welder; DC arc welder; 10 KW AC power plant; 1 KW DC while welding

D-250-L ROUSTABOUT
Three-in-One:
DC arc welder; 10 KW AC power plant; 1 KW DC while welding

D-250-W ROUGHNECK
Two-in-One:
DC arc welder; 1 KW DC while welding

Here's what makes this Miller model the "Five-in-One":

1. AC welder for metallic arc welding
2. DC welder for metallic arc welding
3. AC or DC welder for TIG welding
4. A 10 KW, 115/230v single phase 60 cycle power plant
5. 1 KW of DC while welding

The DAH-350-L Fireball, driven by Hercules 32 hp engine, is another Miller FIRST, offers both a-c and d-c for metallic arc or TIG welding with three separate a-c and d-c amperage ranges for each.

There's continuous high frequency for a-c TIG welding with choice of "start only" or constant high frequency for d-c TIG work.

Standard equipment includes built-in high frequency stabilizer, polarity switch, power supply for water coolant system, and automatic inert gas control panel with solenoid valve and post flow timer. Trailers are available for welder only or for welder with coolant system and gas cylinders.

SPECIFICATIONS

WELDING RANGE	Metallic Arc	Tungsten Arc
	35-100 Amps AC	35- 75 Amps AC
	65-160 Amps AC	65-160 Amps AC
	110-400 Amps AC	150-375 Amps AC
	35- 80 Amps DC	35-100 Amps DC
	75-175 Amps DC	85-225 Amps DC
	125-350 Amps DC	170-375 Amps DC

RATED OUTPUT . . . . . 250 Amps Tungsten Arc, 100% Duty Cycle DC
300 Amps Tungsten Arc, 100% Duty Cycle AC
CURRENT ADJUSTMENT STEPS . . . . Infinite
MAXIMUM O.C.V. . . . . 72 Volts DC
80 Volts AC
1 KW DC AUXILIARY POWER . . . . 115 Volts
AC GENERATOR OUTPUT . . . . 10 KW
OUTPUT VOLTAGE . . . . 115/230 Volt, 1 Phase, 60 Cycle

Complete specifications on these welders will be sent promptly upon request.

miller ELECTRIC MANUFACTURING COMPANY, INC., APPLETON, WISCONSIN
EXPORT OFFICE 250 West 57th St., New York 19 N.Y. • Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

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JACKS
Capacities to
600 Tons—48" Travel

Jacking Equipment for
Pipe Pushing
Erection
Pile Driving
Pile Testing
Slip Forms
Tunnel Shields
Prestressed Concrete
many other

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Immediate Delivery
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Structural Steel
BRIDGES and BUILDINGS

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and Shops
PHOENIXVILLE, PA.

Subsidiary—Phoenix Steel Corporation

CIRCLE 151 ON READER SERVICE CARD

NOW! A NEW CONCEPT IN COMPUTER DESIGN SETS A NEW STANDARD OF VERSATILITY AND VALUE!

THE FULLY-TRANSISTORIZED

RPC-4000 ELECTRONIC COMPUTING SYSTEM

The RPC-4000 is a new, fully-transistorized electronic computing system with the largest memory, greatest problem-solving capacity and flexibility in the low- or medium-priced field. It is the latest member of a growing family from the people whose LGP-30 has become the world's leading small-scale computer.

Wide range of applications: the RPC-4000 has been designed for engineering, scientific, business data processing and management control functions. Such jobs as product and process design, statistical analysis, research, inventory control, payroll and sales analysis are all well within its capabilities.

Easy to use: the RPC-4000 is simple to program and operate. Royal McBee compiling and translating routines allow even non-technical personnel to obtain maximum results. Versatile command structure gives programming speed and flexibility.

Available at low cost: high capacity, flexibility and ease of operation make the RPC-4000 the outstanding computer value on the market today.

Minimum operating costs: the RPC-4000 requires no site preparation or special maintenance. It is powered from any ordinary wall outlet.

Continuing assistance: users benefit from free training, an information exchange service, and library of programs.

Heart of the RPC-4000 system is a new transistorized computer with advanced design concepts that provide substantial computing speed and capacity in a low-cost unit. Magnetic memory drum stores *8008 words*. Operating speeds are as high as 230,000/minute.

Standard input-output is a tape typewriter system which includes a Royal electric encoding-decoding typewriter complete with desk and chair, plus a tape punch-read console. Read speed is 60 characters/sec., punch speed 30 characters/sec. Typewriter, punch and reader may be interconnected in any combination for both on-line and off-line operations.

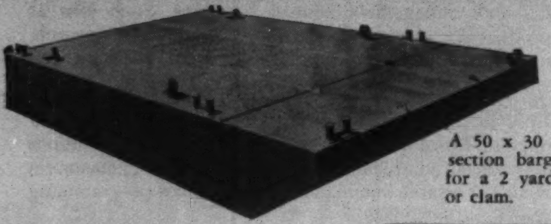
A new 500 character/sec. photoelectric tape reader and a 300 character/sec. punch are available as optional input-output equipment. A magnetic tape unit and a line printer will be available soon. As many as 17 input-output devices (60 with minor modification) may be connected on-line to the basic system. All peripheral equipment is under automatic program control of the computer.

Royal Precision Corporation

Royal Precision is jointly owned by the Royal McBee and General Precision Equipment Corporations. RPC-4000 sales and service are available coast-to-coast, in Canada and abroad through Royal McBee Data Processing Offices. For full, detailed specifications on the new, transistorized RPC-4000, write **ROYAL McBEE** data processing division, Port Chester, N.Y.

CIRCLE 153 ON READER SERVICE CARD

MANITOWOC
SECTIONAL BARGES



A 50 x 30 foot four-section barge suitable for a 2 yard dragline or clam.

- For floating all sizes of lift cranes, clams, draglines and other contractors' equipment.
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- Sections can be assembled into numerous barge sizes.
- Spuds, deck fittings, loading ramps and other accessories available.

Above, a sectional barge completely assembled with crane, spuds and deck equipment ready to go to work.

Designed for the contractor who needs low cost, flexible and portable floating equipment, a typical clam operation performed from a sectional barge.

Write for additional information and prices.

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MANITOWOC SHIPBUILDING INC.
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Tunnel Races Rain

Mexico City must bore 11 miles in 9 months

Mexico City is pushing to complete construction of an 11-mile, 13-ft-dia drainage tunnel before the rainy season. The $7.2-million project is designed to divert storm water from the Federal District drainage system to the Rio de los Remedios, which flows into Texcoco Lake.

Texcoco Lake will be used as a storage reservoir for drainage water which could then be released into the Gran Canal at low-flow periods.

The Gran Canal, built in 1890, is Mexico City's prime conveyor of sewage and drainage water. Much of the sewage is pumped to locations from which gravity flow can move it out of the city.

A tremendous overload of the pumping system occurs during the rainy season. The difficulty is aggravated by the continuous settlement of the city–6 to 12 in. per year.

A series of flood-control dams and the new interceptor tunnel, combined with a series of receiving stations and drains in the city itself, will confine and stabilize the inflow of rainy season flood waters and eliminate the chronic overload of the pumping system.

To complete the job in the nine months between rainy seasons the city has 11 construction companies working simultaneously.

About 70% of the tunneling is going on under residential areas at depths of roughly 100 ft. Four of the 11 contractors are working in open cut. The others are tunneling. Most tunnelers are working two headings from shafts located midway in their sections.

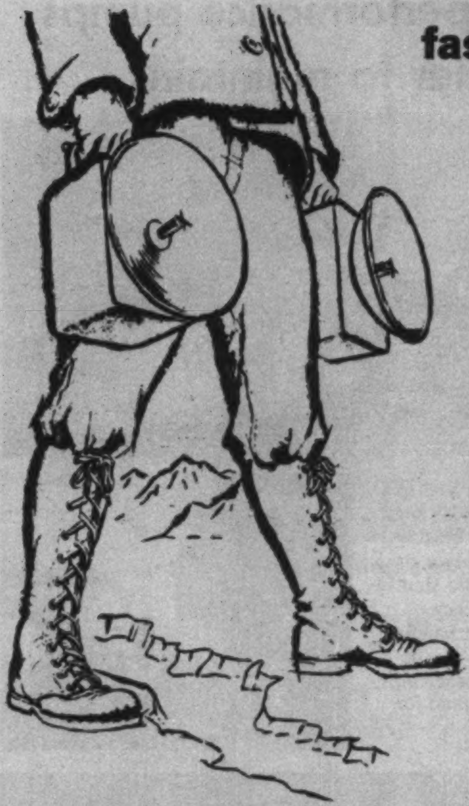
A plan is being studied for use of water from the interceptor for industrial purposes and irrigation.

India Plans to Double Road System in 20 Years

India has drawn up an $11-million program for doubling its road network in the next 20 years. Half the money will go for national and state highways.

The plan includes a main east-west highway that will be India's part of the Pan-Asian highway, which will stretch from Ankara to Singapore (ENR Dec. 17, 1959, p. 52).

Except for roads connecting major cities and the Grand Trunk Road that runs from Calcutta across the northern plains to the border of West Pakistan, India has very few good roads. There is a well developed railroad system.



Take a giant step to fast, low-cost surveying with

MICRO-DIST

precision electronic surveying equipment

FAST: Weeks of surveying completed in a few hours

WIDE RANGE: 250 feet to 50 miles

ALL-WEATHER OPERATION: Unhampered by bad weather, unfavorable climate, darkness . . . you get the job done

HIGH ACCURACY: First-order accuracy over 90% of the range

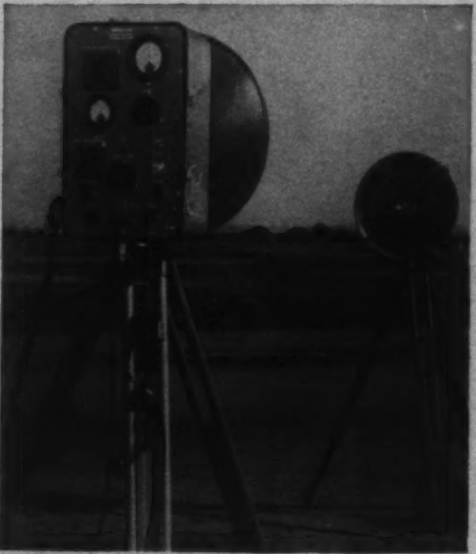
RELIABLE: American electronic know-how assures operational dependability

FIELD-PROVED Micro-Dist, lightweight and portable, provides surveying accuracy of 3 p.p.m. ±1 inch over ranges from 250 feet to 50 miles. Operating on an interrogator-responder electronic principle, either of the interchangeable stations can serve as master or slave, a feature which makes the Micro-Dist system faster and more flexible.

TIME-SAVING features include illuminated direct digital readout which minimizes the danger of costly operator error through misinterpretation . . . speeds up conversion of electronic measurement to linear distance and makes the total measuring operation faster, easier. Crystal calibration and crystal synchronization are automatic. Transistorization makes warm-up time negligible.

ALL-WEATHER OPERATION is possible through wide temperature range capabilities, water-sealed cases and illuminated panel. A regulated power supply minimizes the danger of unexpected battery run-down.

OTHER FEATURES include headsets for the built-in two-way radio link, freeing the operator's hands; standard plug-in circuit design for ease of routine maintenance; rugged construction for dependable field use; advanced electronic design for unparalleled reliability.



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CIRCLE 155 ON READER SERVICE CARD

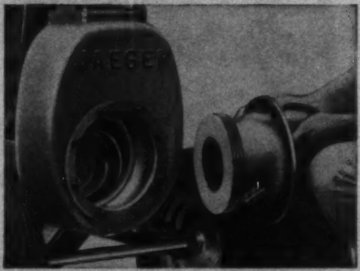
Jaeger announces new high-performance pumps that are quicker and easier to maintain

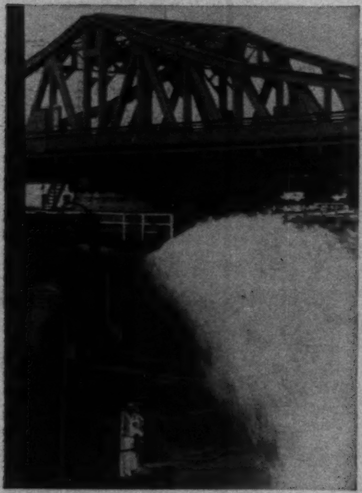
NEW MODEL 3PN, above, pumps all the water a 3″ suction hose can handle at 5′ lift. Pumps 28,000 gph at 10′ lift when a 4″ suction hose is used. Sure-priming is correspondingly fast, at all practical suction lifts.

MODEL 3XPN is a comparably improved smaller 3″ pump. We believe it is the finest pump you can buy under the AGC "15-M" rating.

LOOK HOW EASY TO MAINTAIN: New design of both pumps enables you to remove suction chamber and liner without removing volute, and quickly rotate or replace the liner plate or adjust its clearance with plastic shim gaskets. Maintains peak efficiency.

Jaeger pumps know how to handle water. For the right pump for any dewatering or pressure pumping problem, see your Jaeger distributor or send for latest catalog.





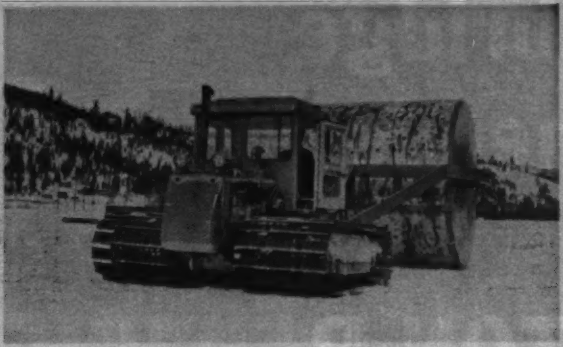
BIG CAPACITY FOR BIG JOBS: This Jaeger 10″ is doing a fast job of dewatering a 43½′ x 129½′ x 26′ deep cofferdam after the pouring of an 8′ thick bridge pier foundation with 1500 cu. yds. of tremie concrete. With a Jaeger 6″ pump also on the job, contractor had well over 300,000 gph of water handling capacity.

DIAPHRAGM PUMPS HAVE SHOCK-ABSORBING SPRING-BOTTOM BOWL: Cushions impact of stones and foreign matter on dirty pumping jobs. Also prevents build-up of cement where grout is present. In 3″ and 4″ models.

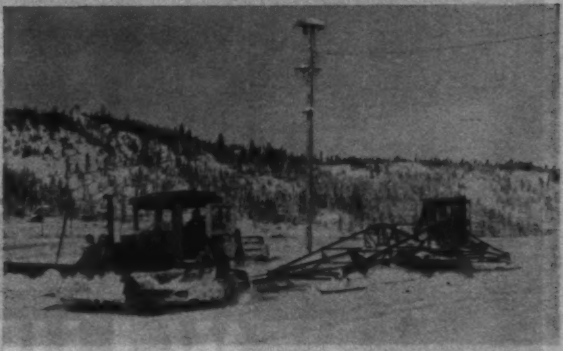
JAEGER 4P IS RIGHT PUMP FOR THIS 18′ DEEP SEWER TRENCH: Provides big water handling capacity with portability on work where the pump moves with the job.

THE JAEGER MACHINE COMPANY, 200 Dublin Avenue, Columbus 16, Ohio
Jaeger Machine Company of Canada, Ltd., St. Thomas, Ontario

Seabees built this giant parking area at Squaw Valley, using polar airfield techniques.

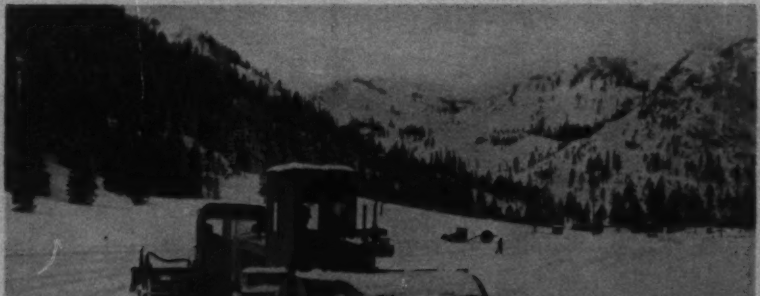


Large five-ton roller compacts snow, while . . .



Long-wheelbase snow plane levels parking area.

(S)no Concrete on This Parking Lot



Mixer is used to supplement rolling when snow is deep.

Visitors to the 1960 Winter Olympics at Squaw Valley parked their cars on 2 ft of compacted snow. The parking lot, which accommodated 10,000 autos on the busiest day, was prepared by a team of Navy scientists and Seabees.

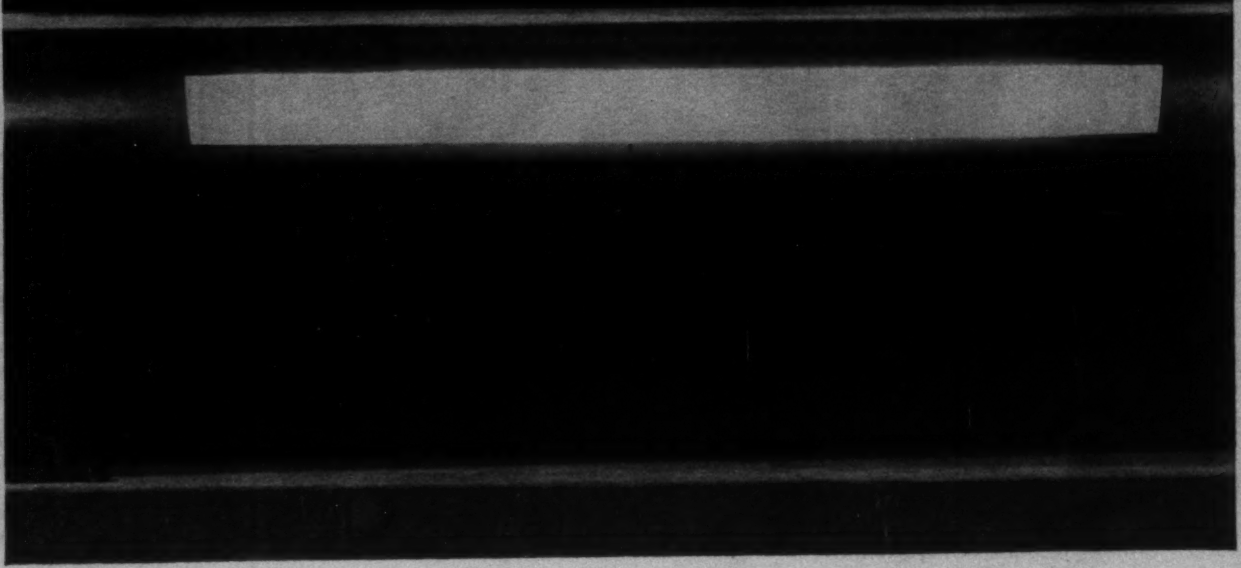
Engineers at the Naval Civil Engineering Laboratory in Port Hueneme, Calif., have spent several years studying how to compact snow as part of their polar region program. Compaction is particularly useful as a method for constructing landing fields—some Navy-built snow landing fields accommodate planes as heavy as the C-130.

The Navy was asked some three years ago to help solve the Squaw Valley parking problem. Since this seemed to be a good opportunity to test snow compaction procedures, the challenge

(*Continued p. 160*)

This is
the only
light
a bridge
needs

NEW LUPTON RAILIGHT*



New LUPTON bridge railing has built-in General Electric luminaires

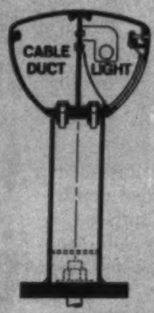
New LUPTON RAILIGHT* is today's most advanced concept in roadway lighting. Now available in standard units for all roadway installations, it offers you these significant advantages: greater driving safety from uniform low-level light focused directly on the road; unlimited opportunity for road railing design; savings in initial cost, operation, and maintenance.

Supplementary advantages are the elimination of glare; the confining of light to the road only; a clear view of roadway limits; increased effectiveness in fog, rain, or snow; efficient use of candle power.

And like every other LUPTON bridge job, installation is simple, because two men, with wrenches as their main tools, can install the lightweight aluminum parts. Maintenance is just as simple, because this non-rusting aluminum never needs painting—almost never needs replacement. And the lights themselves are handy for maintenance.

Write today to Michael Flynn Manufacturing Company's main office for more information on LUPTON RAILIGHT. Find out in detail how advantageously it can work for you.

**Trademark*



This cross section of LUPTON RAILIGHT shows the cable raceway, and how easily the top can be removed for maintenance with use of a simple special tool. A rigid shield of plastic protects the luminaire. Other top rail features include a reinforcing spine, and drain holes for condensed moisture.

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Final step is spreading of 1-in. insulating sawdust layer.

was accepted. During the two winters preceding the 1960 Winter Olympics, personnel from Port Hueneme conducted tests to determine the feasibility of the method. These tests were made by a team of scientists headed by E. H. Moser, director of the polar division of the Navy lab.

Snow compaction involves two techniques—compressive compaction and depth processing. Compressive compaction may be used alone if the snow depth on the ground or on previously compacted snow is compressible to about 6 in. But if the snow is deeper, depth processing must be used too.

Compressive compaction entails alternate rolling and planing the snow until it reaches the required degree of hardness and is level enough for the required purpose.

One of the basic tools developed by the Navy for compressive compaction is an 8-ft-dia, five-ton roller. The weight is needed to compact the snow and the large diameter is needed to prevent the roller from sinking too deep. Used in conjunction with the roller is a snow plane to level the surface. This is simply a land plane mounted on metal skids.

Depth processing must be used when the snow is too deep to be compacted properly. Basic tool is a snow mixer, which blends the fine grained snow on the surface with coarser grained older snow below. The Navy's scientists have found that snow thus blended and then rolled will set up or harden under freezing conditions. If there is not enough moisture in the snow to adequately bond it, free water can be added.

The snow mixer used at Squaw Valley is a Seaman Pulvimixer modified for snow use. Modifications involved putting skis or skids on the unit and increasing the rotor speed.

The Navy's scientists have also found that in areas like California's high Sierras solar radiation can cause daytime surface melting. Parking areas—or runways for that matter—can be insulated from such melting by spreading sawdust over the prepared surface. A farm fertilizer spreader was adapted by the Navy for this purpose. The sawdust, in addition to preventing the undue melting, aids traction on the otherwise slick surface. And, if melting does occur, the sawdust absorbs the free moisture. Such moisture often freezes during the night in such locations, forming a hard ice layer right under the inch-thick layer of sawdust.

At Squaw Valley there was 18 in. of old snow on the parking area. Warm rains, which hit about a week before the Olympics, caused some concern, but did not ruin the parking lot. Instead it hardened the surface of the old snow. The rain was followed by 24 in. of new snow. This was compacted to an 8 in. thickness but needed depth processing to form a proper surface.

Finally, on opening day of the Olympics, another 11 in. snow fall occurred. That was adequately handled by compressive compaction followed by the spreading of a layer of sawdust.

Because of the timing of the snow falls, compaction of the 125-acre meadow was a day-and-night operation by Seabees of Mobile Construction Battalion 10 from Port Hueneme. The Seabee detachment was commanded by Lt. (jg) L. E. Doughty, CEC USNR.

The compaction-sawdust method was much simpler than would have been the job of clearing snow from the area. Average annual snowfall at Squaw Valley is 450 in. With alternate freezing and thawing, the unpaved area would have been a morass of mud had clearing been attempted.

The same techniques were used to prepare approach roads leading into Squaw Valley.

Pre-Fab School

Geodesic four-room school can be built in two weeks

Raleigh Synergetics, Inc., applying the geodesic building system, has designed a four classroom school that can be taken apart, packaged, shipped, and that is suitable for factory production methods.

Ten men will be able to take apart and package the modular prefabricated building in two weeks. They can put it together in the same amount of time.

The structure is a modified dome 80 ft in diameter. It consists of a lightweight aluminum frame exposed on the exterior, the interior has a suspended roof and wall surface of porcelain metal insulated sandwich panels. Both the aluminum section tubes of the frame and the sandwich panels of the roof and wall are bolted.

The center of the structure contains the mechanical core, toilets, electrical unit, air-conditioning and ventilation units.

The four classrooms each are 1,100 sq ft; they are separated by double sliding partitions of tack and chalk board. Space between the sliding partitions forms cloak rooms. The partitions also can be pushed back into the central core, thus making available up to 4,400 sq ft of space. Total space in the structure is 5,000 sq ft.

Moveable furniture is to be used wherever possible. Each classroom has an outside door. The side walls have view windows. Interior lighting is overhead.

All that a local school board will have to provide is an 80-ft circular concrete slab with a trench leading to the center for electrical, water and sewage lines.

The prototype school is estimated to cost about $100,000 to build. But a standardized model should cost considerably less.

The transportable school is being designed for the Educational Facilities Laboratories, Inc. of the Ford Foundation.

Vinyl Sea Water Intake Brings Ocean to Lobsters

A 6-in. vinyl pipeline is being used as an ocean water intake at the Massachusetts State Research and Lobster Station on Martha's Vineyard Island.

The line brings sea water 250 ft to the station where it is used in the propagation of shellfish and lobsters for restocking coastal waters.

Made of Geon vinyl, the pipe eliminates salt-water corrosion—a major cause of pipe failure in the past.

(*Field and Office continued p. 162*)

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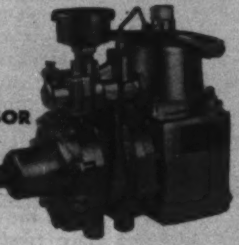
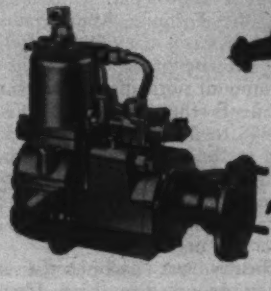
for safer control of off-the-road equipment?

INSTALL Wagner® Lockheed ROTARY AIR COMPRESSORS



STANDARD AIR COMPRESSOR



DRIVE-THRU AIR COMPRESSOR

You'll have plenty of air reserve for braking and control when you use Wagner Lockheed Rotary Air Compressors on your equipment. Rotary action, with four impulses per revolution instead of two, assures rapid pressure recovery—ample air reserve.

Rotary operation cools air in compressor and dome before it is discharged into the line. Low discharge temperature prevents carbon formation—reduces fire hazard—lets you use flexible hose for the discharge line. The smooth operation created by thousands of small, overlapping air compression impulses per minute increases belt and coupler life—eliminates severe shock to the drive train. The use of only two sleeve type bearing surfaces adds to compressor life. Bearings have steel-backed, babbitt-lined, renewable inserts.

Wagner Lockheed Rotary Compressors are available in either 9 C.F.M. capacity, air or water cooled; or in 12 C.F.M. capacity, water cooled. Also in a "Drive-Thru" type for diesel engines.

Complete Balanced Systems for your Equipment

Look to *one* source—Wagner . . . for complete braking systems . . . straight air or air over hydraulic. Wagner's wide variety of brake products includes power source, application units, and foundation brakes. REMEMBER, when ordering new equipment, be sure to specify Wagner Lockheed. Full details are yours in Catalog KU-201.

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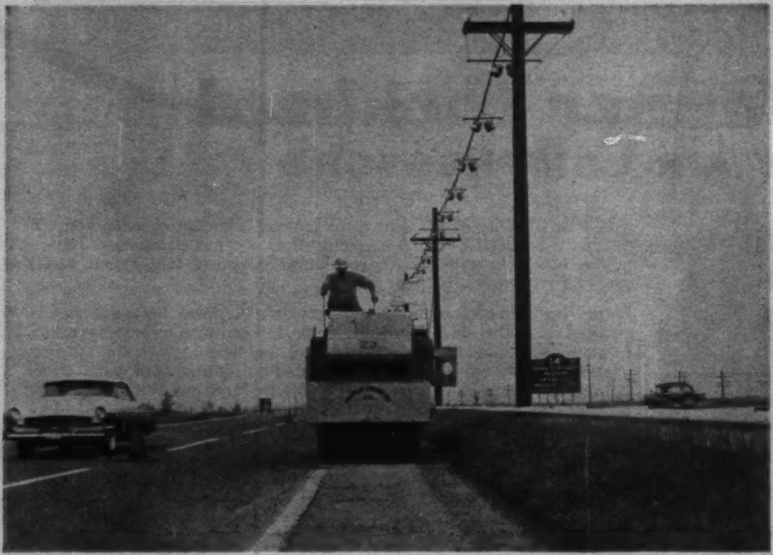
Neoprene-Modified Asphalt Used...



. . . To Surface Pike Shoulders

Engineers are specifying neoprene-modified asphalt for construction and maintenance of inside shoulders on the New Jersey Turnpike. Two installations, totaling 13 miles in each direction, have been completed between Newark and the northern terminus of the turnpike near the George Washington Bridge.

This use for neoprene-modified asphalt is the latest in a series of applications pioneered by the Turnpike Maintenance Department. Neoprene has been used previously with asphalt emulsion to fill longitudinal cracks in the bituminous concrete pavement. Other uses of neoprene with various types of asphalt include the sealing of joints in sections of concrete pavement and bridge decks, sealing underbridge slope protection pavement, and experimental surface treatments on the bituminous concrete roadways to improve anti-skid qualities.

The prime reasons for the use of the material on the shoulders are said to be improved workability, better chip retention and lasting elasticity imparted to asphalt by quantities of neoprene as low as 1½%.

An additional factor is the ability to return the highway to full service rapidly after laying down the surface, according to Harold W. Goldberger, Turnpike Maintenance Engineer. Speed in completing shoulder surface treatment is important in order that the adjoining traveled lane, temporarily closed to vehicles, may be opened again to traffic.

The turnpike carries one of the heaviest volumes of traffic in the country—more than 46,200,000 cars, trucks, and buses last year. To minimize interference with traffic flow, the Turnpike Maintenance Department and its contractors confine maintenance and construction operations on its roadways to midweek days during daylight hours.

Workmen apply cutback asphalt—Grade RC-2 or RC-3—modified with 1½% neoprene by weight and heated to 150°F minimum or 200°F maximum by use of a standard pressure distributor at an average rate of 0.3 gal per sq yd for seal coating an existing 3-in. course of pentration macadam on the shoulders. The stone cover is ⅜-in. aggregate applied at a rate of 25 lbs per sq yd by tail gate spreaders or other mechanical means. The cover is rolled with an eight-ton tandem roller.

The first installation of seal coating with neoprene-modified asphalt on the New Jersey Turnpike—made in June, 1959—covered six miles of inside shoulders between Newark and the south end of the Passaic River Bridge. The second, covering seven miles from the north end of the Hackensack River Bridge to the northern terminus of the turnpike, was made in November.

Initial adoption of neoprene-modified asphalt by the Turnpike Maintenance Department was as a crack filler. Modified with 3% neoprene by weight—twice the amount normally used in surface treatments—the asphalt was first used in 1958 to fill longitudinal cracks developing in the traffic lanes. Because of the location of the cracks and their size—as great as 1 in. wide, ¾ in. deep and 50 ft long in some cases—a rapid curing filler was needed.

No difficulty was encountered in pouring the neoprene-emulsion blend into the cracks. This procedure is now standard.

The filling operation is accomplished by pouring the mixture of neoprene and asphalt emulsion, Grade RS-1, into the crack and covering with a sharp, hard, manufactured stone sand. Excess loose sand is whipped off the roadway surface by traffic.

In a normal working day, the maintenance sealing crew is able to cover about one mile of three-lane pavement. The cost of this operation is variable. A good average for labor costs, however, would be about $100 per day.

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USAF

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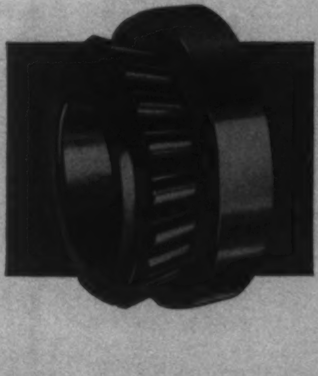
Whether you build, buy or maintain trucking equipment—or *any* product that uses roller bearings—ask for Bower first. You can select from a complete line of tapered, straight and journal roller bearings for every field of transportation and industry.



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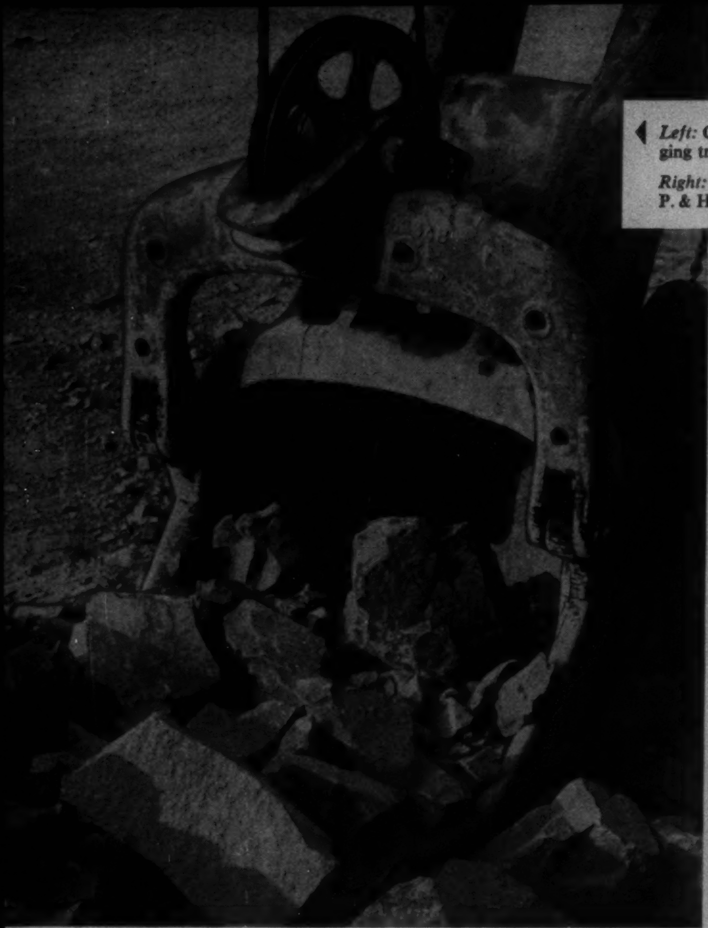
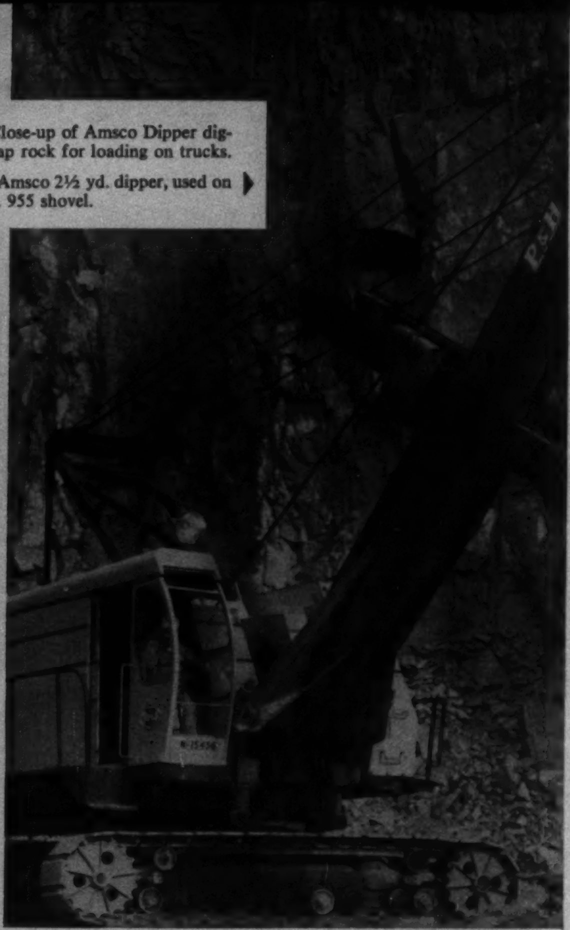
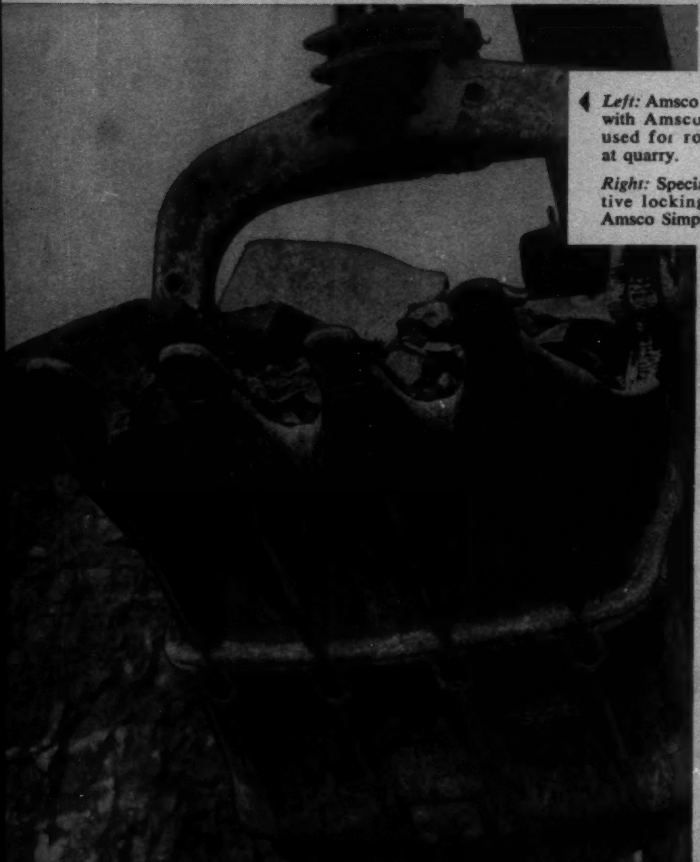
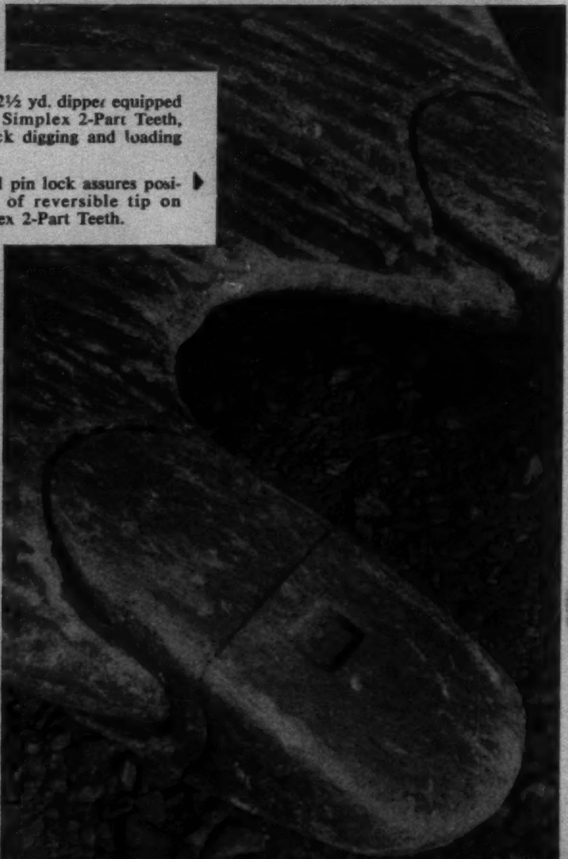




Left: Close-up of Amsco Dipper digging trap rock for loading on trucks.

Right: Amsco 2½ yd. dipper, used on P. & H. 955 shovel.





Left: Amsco 2½ yd. dipper equipped with Amsco Simplex 2-Part Teeth, used for rock digging and loading at quarry.

Right: Special pin lock assures positive locking of reversible tip on Amsco Simplex 2-Part Teeth.

More proof that...

AMSCO HELPS YOU MOVE MORE TONS PER DOLLAR

Read about the actual experience of a large New England quarry with Amsco Dippers and Simplex 2-Part Teeth*

"WE HAVEN'T WORN OUT AN AMSCO DIPPER IN 5 YEARS"

This, in the words of the quarry superintendent, sums up his experience with Amsco Manganese Steel Dippers. It's rugged work, all in rock, as you see from the pictures at the left. Shovel and dipper are used to load trap rock onto trucks for transportation to the crushing plant.

The Amsco Dipper was installed because the superintendent had used them before, and knew their reputation for long life under tough digging conditions. Experience is proving him right . . . again.

SIMPLEX TEETH HANDLE 25,000 YDS. OF ROCK BEFORE REPLACEMENT

At this same quarry, Amsco Simplex 2-Part Teeth are giving 120 hours' service...handling 25,000 to 30,000 yards of rock...before replacement is necessary. That's considerably longer service than has been obtained from competitive 2-part teeth, the quarry superintendent states.

Not only is the wear-life of these teeth exceptional, but operators like the ease of replacement, and the fact that the tips stay on without trouble.

For further information on Amsco Dippers or Simplex 2-Part Teeth, see your power shovel equipment dealer, or write to Amsco for technical bulletins showing sizes, types and application data.

*Patent No. 2,904,908.

AMERICAN **Brake Shoe** COMPANY

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Other plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis
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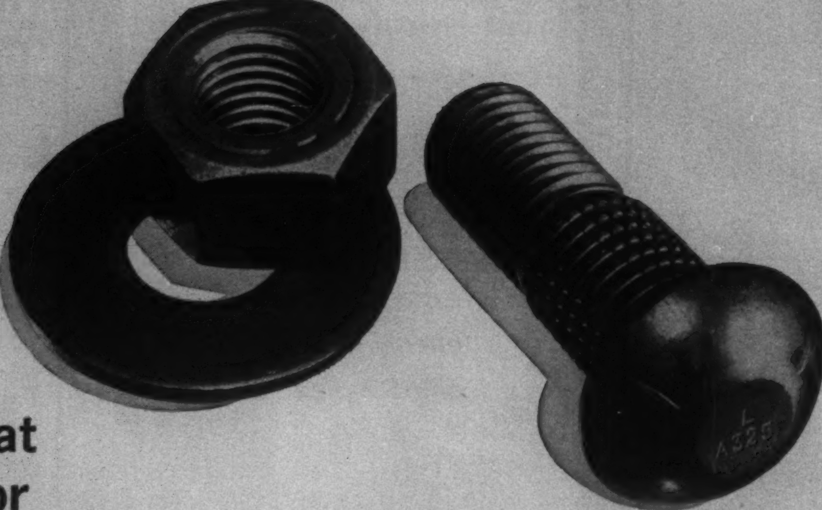

Read what an erector has to say about

HIGH STRENGTH BEARING BOLTS!

(Company name on request)

"Our company had the erection contract for six steel mill buildings in Beaver Valley. The owner was interested in using High Strength Bearing Bolts in two of their buildings, because of the rigidity and stability they promised to provide for buildings subject to heavy service use. L & S was contacted on price and delivery, and on finding the new bolts cost no more and were available, they authorized their use.

AT BEAVER VALLEY, PENNSYLVANIA

One of two recently completed steel mill buildings using High Strength Bearing Bolts for all bolted connections.

"We found that the bolts were installed with a minimum of difficulty. Our bolt-up crews had had no previous experience with the Bearing Bolt. All of the men had worked with Dardelet, High Strength and machine bolts. After the first few hours they found they were installing the new bolt much faster than Dardelet and in a majority of the connections about as fast as for High Strength Bolts.

"We used the same tools that were used for High Strength Bolts. The men were able to work independently from one another while making hand assembly of the truss connections on the ground. It was not necessary to hold the head of the bolt while snugging the nut as is the case for High Strength Bolts. Thus better distribution of labor was possible. Nuts were snugged up by hand and were later torqued in the air to eliminate any question about which bolts were tight.

"Trusses were stable and were lifted into position with a single sling at the truss apex. It was also found that they were straight and true, and aligning the bottom chord with truss bracing was simplified. Savings developed in crane walkway plate connections where one man was free to insert the next bolt ahead of the impact man once a bolt had been placed in the hole, and washer and nut were added.

"The crews were able to proceed in the same manner as for assembly of High Strength Bolts at other connection points, such as bracing, crane girders and the like.

"The owner had offered to pay the difference between the cost for installing the new bolts as compared to High Strength Bolts. There was no additional charge for this installation."

5 BASIC FACTS ABOUT HIGH STRENGTH BEARING BOLTS

1. High Strength Bearing Bolts combine the tensile strength of a High Strength Bolt with the bearing of rivets.
2. High Strength Bearing Bolts have the highest shear strength and greatest resistance to slip of all structural fasteners.
3. High Strength Bearing Bolts make possible important labor savings in fabrication and erection.
4. The High Strength Bearing Bolt assembly (bolt, nut and one washer) costs no more, grip for grip, than a High Strength Bolt assembly (bolt, nut, two washers).
5. High Strength Bearing Bolts (and Lamson High Strength Bolts) are available from all the Steel Service Centers of U. S. S. Supply Division, United States Steel Corporation. Contact L & S, or any U. S. S. Supply Division Steel Service Center for details.

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1. Steel strips attach to building frame.

2. Sidewall panels attach securely to strips.

3. Ceiling panel is placed by bowing into form.

New Dry Wall Method Cuts Time, Costs

A new method of installing dry wall soon will help cut homebuilding costs.

The system has been developed through joint research by National Association of Home Builders Research Institute and United States Steel Corp.

The "SteelFast" system uses cold formed steel members at all corner and ceiling joints. These shapes, nailed to the framing, are formed to support dry wall sheets along their edges.

The SteelFast member assures plumb and level lines because it is nailed to the top plate and only one surface of the corner steel post. Even if the post is out of plumb, the strip can be adjusted to form a true vertical line. Dry wall panels are held evenly in place at the edge of the steel member, instead of following the contour of uneven ceiling joists and out-of-plumb corners.

A corner clip ties vertical and horizontal steel members together to form a corner and provide a finished surface.

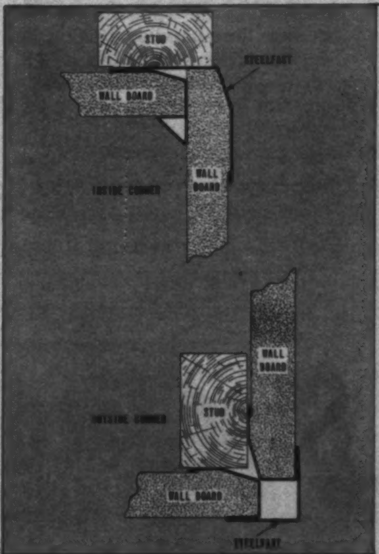
Wall panel erection begins in a corner and is carried around the room. No nailing is required at ceiling and corner joints. And proper placement of studs eliminates cutting panels to width; except at corners.

A recent field test indicates that the new system can cut building time for a 1,200-sq-ft home by two or more days and save $21.01 over-all installation cost over present methods, according to Ralph J. Johnson, director of the NAHB Research Institute.

The field test eliminated backing lumber normally used to provide nailing surfaces at the ceiling line and at most corners. Conventional corner posts made of three 2x4s nailed together to form two nailing surfaces were eliminated, as were the usual "T" posts where partitions join main walls.

SteelFast will be made available to builders as soon as final refinements are worked out and a marketing plan is completed—perhaps in 1961.

(R&D continued p. 168)



4. Here's how dry wall is held.

CONCRETE IS NOT FOREVER

It pays an engineer to remind himself that concrete starts to break down the instant the forms are off . . . in major or minor degree depending on weather, corrosion or moisture pressure. When conditions are severe, no reminder is necessary, but somewhat more obscure is the need for high quality protective materials. Inferior coatings always cost more eventually. Since 1912, Standard Dry Wall, Inc. has been in no other business than the protection of masonry, and its products are leaders in the field. Thoroseal, for example, may be easily applied with our money-saving, long-handled brush, and will impart both a waterproof and decorative surface in gray, white or color. Write for our free specification folder on all Thoro System products.

Please send new 20-page specification guide describing all products and uses.

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Company__________

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Standard | Dry Wall Products, Inc.

Box X-2 New Eagle, Pa.

Plants at New Eagle, Pennsylvania and Centerville, Indiana

Plastic Film Still Good After Ten-Year Burial

Plastic lining materials for canals have shown up well in long-term tests by the Bureau of Reclamation.

The researchers concluded that most common polyethylene and vinyl plastic films of at least 0.008-in. thickness are watertight, resistant to bacteriological and chemical deterioration, and impenetrable to most weeds. They found the vinyl film readily spliceable with solvent in the field. The heat-pressure process of sealing polyethylene is not so well adapted to field conditions, they say, but modifications may improve it.

The Bureau's Engineering Laboratories in Denver made the studies on some 60 plastic materials obtained from 15 manufacturers. Tested were vinyl-coated canvas, petroleum polymer, vinyl-coated paper, polystyrene, polyethylene and polyvinyl chloride. Thicknesses varied from 0.001 in. to 0.025 in.

Composted soil used in the test was prepared according to usual greenhouse practice so the liners would be subjected to attack by micro-organisms. The soil was placed in metal containers coated on the inside with asphalt cement. Moisture content was kept at 25 to 30%, the best level for micro-organism activity. Temperature was maintained at 100 F.

Burial in soil up to 10 years did not cause significant chemical or physical changes in the plastics, according to Grant Bloodgood, assistant commissioner and chief engineer of the bureau.

Micro-biological deteriorating effects were studied by frequent checks of untreated cotton duck and burlap. These materials lost as much as 70% of their tensile strength after one week of burial and more than 90% after two weeks.

New Standards Approved For Testing Dry-Set Mortar

The American Standards Association has approved new standards for testing dry-set mortar for installation of ceramic tile. Major items covered by the new standards are shrinkage, shear strength, and cohesion.

Dry-set mortar requires no soaking of tile or wetting of walls prior to installation. Polymers added to the portland cement mix enable the mortar to hold water even when applied to highly absorptive materials like concrete block.

Pre-installation work with dry-set mortars requires only beds of $\frac{1}{8}$ in. for floors and $\frac{3}{32}$ in. for walls.

Laboratory shear tests have shown dry-set mortar developing 500 psi strength at seven days.

(*R & D continued p. 170*)

MORE mobility on high-density compaction jobs

Lima Roadpacker gets smooth response from 3 Twin Disc Oil-Actuated Clutches

The Lima Roadpacker has dispelled the idea that high-density compaction has to be a snail-paced operation. This agile unit has a compacting speed range of 20 to 95 fpm and shifts instantly for fast travel (up to 30 mph) from job to job or around a job site. It compacts with equal precision in forward or reverse. Six heavy shoes, each producing 2200 vertical vibrations per minute, fill all voids from bottom up without shoving action.

The Roadpacker's mobility is due in large part to three 5" Twin Disc DOC Clutches. The first of these oil-actuated multiple-plate clutches drives the main vibrator pump. Another engages the hydraulic propelling mechanism for compacting range operation. The third is used in highway travel range.

Built to run in oil, Twin Disc DOC Clutches are compact in size, smooth and trouble-free in performance. They never need adjustment because ram travel increases automatically as the plates wear down.

The oil-actuated clutch used in the Lima Roadpacker is one of a complete line of friction and fluid drives built by Twin Disc. You'll find these performance-proven drive components on virtually every make of construction equipment.

TWIN DISC CLUTCH COMPANY, Racine, Wisconsin

Hydraulic Division: Rockford, Illinois

TWIN DISC
CLUTCHES AND HYDRAULIC DRIVES

TWIN DISC
Friction Clutches and Fluid Drives

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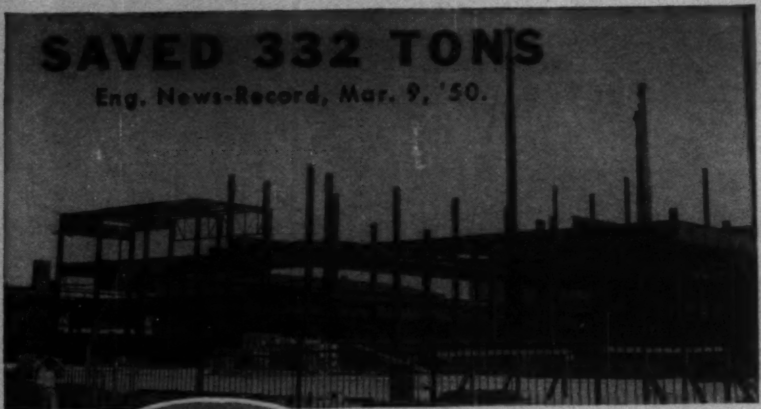

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ENR 360

New Methods Improve Glass Fiber Bond to Concrete

A U. S. Army researcher has removed a major obstacle—the problem of bonding—that has barred glass fibers for reinforcing and prestressing in concrete structural members. Solomon Goldfein, chemical engineer at the Army Engineer Research and Development Laboratories at Fort Belvoir, Virginia, has developed several methods of bonding glass fiber to concrete.

In one method, an epoxy resin coating binds the glass fibers together and bonds them to the concrete. It also protects them from the alkaline action of the cement. Plastic glass fiber rods treated with silicious or cementitious materials also work on this principle.

In another method, plastic reinforcement impregnated with glass fibers is placed in concrete. It hardens as the concrete sets, creating a bond between the two materials.

Mr. Goldfein previously developed prestressing systems using glass fiber tendons. Special gripping devices bonded to the tendons facilitate tensioning.

Another major disadvantage of glass-fiber prestressing and reinforcing is the low modulus of elasticity, about one-third the modulus of steel. A new glass fiber that will have a modulus nearly equal to that of steel is expected to be developed soon.

Although glass fibers will probably never compete economically with steel reinforcing and prestressing cables in ordinary building construction, they may have special uses where corrosion resistance and low conductivity are important.

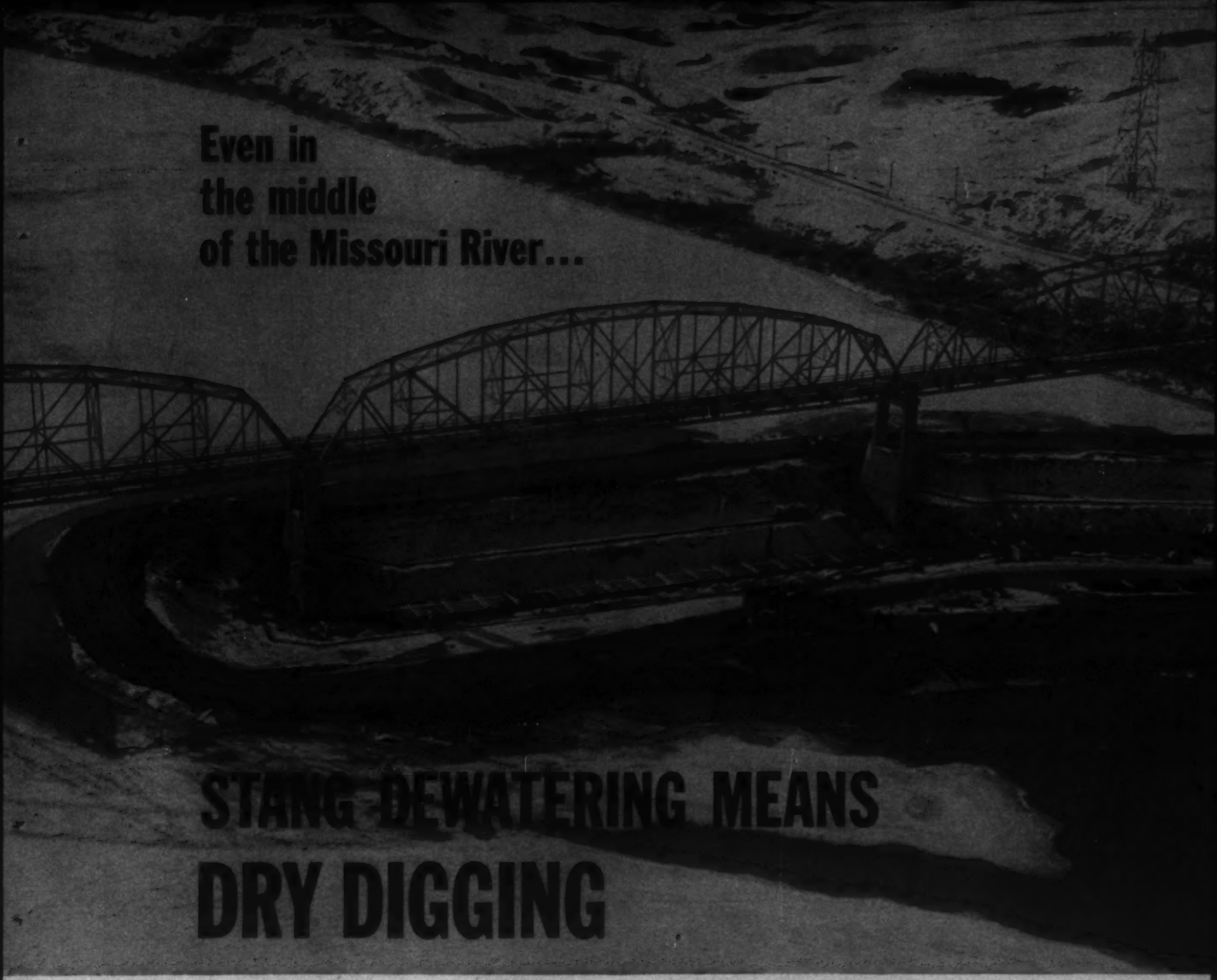
Among these special uses: piles exposed to salt water, concrete ships and reinforced concrete pipe.

Epoxy Resin Coat Improves Steel-to-Concrete Bond

Australian researchers have found that a coating of epoxy resin paint on steel reinforcing bars increases their bond strength nearly fourfold. The epoxy paint is applied just before concrete placement and allowed to cure as the concrete hardens.

The Australians also found that bonding a layer of sand to the bar surfaces with a cured epoxy resin produces comparable bond-strength increase.

These discoveries could radically effect the design of reinforced concrete. A great increase in bond strength would extend the range of large reinforcing bars. It would also diminish the requirements for anchoring web reinforcement and main tensile reinforcing.



700 feet in length and excavated to 23 feet below the surface of the river, the excavation for water intake lines shown above is workably dry—effectively dewatered by a single stage Stang wellpoint system. In spite of sub-zero temperatures, frequent snow falls and a record seasonal high level for the mighty Missouri, the job is progressing at a pace that has put the contractor ahead of schedule and will keep him there. This is the kind of sound engineering, dependable equipment performance and economical water control that typifies a Stang job. Remember: job site water problems are special—and *Stang people are water specialists*. Anywhere, anytime, any weather—if it's a water problem, it will pay you to call Stang.

JOHN W. STANG CORPORATION

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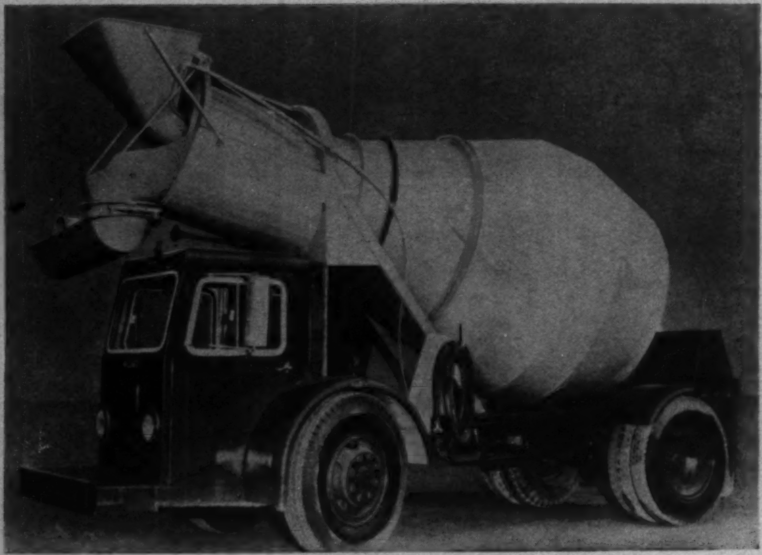

Concrete Mixer Unloads in Front

A front-discharge design makes it possible to drive a concrete transit mixer cab onto the job site, unload to the front and back out empty.

Additional features resulting from this design are said to be shorter wheel base and greater maneuverability due to the elimination of a high mounted water tank, complete control by the driver in the cab and one engine economy. The mixer is operated from the truck engine.

Model shown has a 5 cubic yard capacity on two axles. Planned are other front-discharge mixers with three axle trucks, all-wheel drives and a large selection of truck engines. WILLARD CONCRETE MACHINERY CO., LYNWOOD, CALIF.

Swept-Back Style Truck Mixers

Worthington Corp. has introduced a restyled line of concrete mixers—the Fleet Master and Fleet Builder.

The new styling moves the center of gravity forward in all models, permitting the user to haul more concrete legally.

The new models incorporate a water tank with swept-back triangular design. The rear support frame has been changed from channel to pipe construction. This improvement is said to result in important savings in weight with no loss in strength. A truck type transmission is available in the new models, with four speeds forward and four reverse. An improved water system provides single operation filling through an overflow that fills both flush and mix tanks concurrently. WORTHINGTON CORP., HARRISON, N. J.

Ceiling Will Heat, Cool And Absorb Sound, Too

The Sanacoustic HCS system combines radiant heating, cooling and sound conditioning all in one ceiling. And since the system is made of standard components, it is easy to install and economical to maintain.

The basic components of the new system are: water-carrying coils; a sound absorbing insulating blanket, which should absorb up to 90% of the sound that strikes it; and perforated metal panels, which will serve as the finished ceiling.

In heating, circulating water inside the tubing provides heat that radiates to the steel panels and then downward to room surfaces and occupants.

In cooling, excess heat from rooms and occupants radiates to the ceiling surface and is carried away by cool water circulating in the same coils.

Maintenance reportedly is simplified because there are no moving parts. JOHNS-MANVILLE CORP., 22 EAST 40TH ST., NEW YORK 16, N. Y.

Two Ditching Attachments For Motor Graders

Two new ditching attachments are now available for use with Caterpillar motor graders.

One of these, the U-200 disc-beam attachment, is a curved cutting disc attached to the motor grader by a welded box beam and controlled by the standard grader scarifier controls. Material cut by the disc is directed to the grader blade.

The other is the U-300 motor grader loader, which is attached to the grader through a swinging offset hitch. The loader is centered on the windrow formed by the grader blade. Material is carried by a belt conveyor to a height where it can dump into hauling units trailing the grader. ULMAC EQUIPMENT CO., INC., EL PASO, ILL.

180-Cycle Generator For Concrete Vibrators

A Winco 25-watt, 180-cycle engine generator is designed to supply portable electric power for 180-cycle concrete vibrators and other tools.

The unit provides 2,500 watts of 180 cycle, three-phase, 230 volts, A.C. power, as well as up to 1,500 watts of 110 volts D.C. power for lights and universal motor-driven tools. The generators are powered by Briggs & Stratton four-cycle engines. WINCHARGER CORP., SIOUX CITY 2, IOWA.

Two Mack Mixers Move In

Mack Trucks has announced the B-4626SX, a single-tired, six-wheel drive chassis, and the six-wheel, B-462S, four-wheel drive chassis. The B-4626SX was developed particularly for the transit mix industry. The B-462S can accommodate a concrete mixer and is also adaptable to service as a dump truck.

The wheel base on both trucks is 170½ in., with various optional wheel bases available on both models to meet state weight laws and to provide the best possible weight distribution. The front axle of the B-462S is a non-driving, 11,000 lb rated axle. The B-4626SX features a 15,000 lb rated driving type. Other front axles rated at 9,500 lb and 16,000 lb are available on the B-462S to meet varying weight distribution requirements.

Cabs and sheet metal on both these units have been redesigned to provide a bumper to back-of-cab dimension of 96 in.; this permits mixer installation 7 in. farther forward than previously.

Both are powered by Mack's standard Model 401, 150 hp. Magnadyne engine or optional Mack EN-438, Thermodyne.

A gear-driven rear engine power take-off is being offered for the first time with the B-462S chassis.

Mack's TRQ 77, quadruplex, 20-speed transmission is offered on B-462S trucks and is designed both for on and off-road service.

The B-4626SX comes equipped with a single unit TRDXT 776, wide range, 10-speed, direct, two-lever duplex transmission, consisting of a five-speed main box in combination with a Mack transfer box including a two-speed compound, resulting in an over-all reduction of 152:1. Mack Trucks, Inc., Plainfield, N. J.

Mixer Features 'Flared' Drum

Transcrete transit mixers are available in steel or aluminum in 24 models in all standard sizes with three types of drives: separate engine drive; flywheel truck engine drive; and standard truck engine drive.

The units feature a "flared" drum design, which is said to provide fast discharge. The machines also have a "swing-out hopper," which moves completely out of the way for discharge.

Other features include an automatic wash-down system; single-lever operating control; and an optional "automatic measuring" water tank.

An improved location of the center of gravity is said to provide a bigger payload. Construction Machinery Co., Waterloo, Iowa.

(*New Products continued p. 174*)

Now . . . A LABOR ESTIMATING LIBRARY . . .

. . . that will help you slice estimating time to a minimum, while maintaining maximum accuracy.

Both manuals are by John S. Page and Jim G. Nation

ESTIMATOR'S PIPING MANHOUR MANUAL

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Areas covered in 10 Sections include: Shop Fabrication of Pipe and Fittings; Field Fabrication and Erection; Alloy and Non-Ferrous Fabrication; Underground Piping; Hangers and Supports; Painting; Patent Scaffolding; Insulation; Sample Estimate; Technical Information.

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Areas covered in 15 Sections include: Conduit, Boxes and Fittings; Service and Feeder Wiring; Branch Circuit Items; Lighting Fixtures; Panelboards and Cabinets; Safety Switches; Hangers and Fasteners; Underfloor and Buss Ducts; Starters and Motors; Mounting Transformers; Outside Construction; Underground Duct and Cable; Communication and Signal Systems; Demolition; Excavation and Concrete; Technical Information.

The scores of man-hour tables in each manual contain literally thousands of easy-to-use listings. These listings are valuable guides to estimating man-hours in every phase of electrical or piping installation. They are the result of hundreds of time-and-method studies, coupled with actual labor cost on numerous projects.

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P. O. Box 2608 Houston 1, Texas

FOR QUICK AND POSITIVE FORM ALIGNMENT

New! SUPERIOR Adjusta-Brace

PAT. APPLIED FOR

Permits maximum adjustment in *ANY* direction at *ANY* angle.

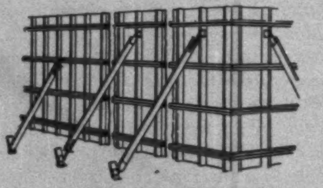
THIS UNIT may be nailed in any position onto stud or waler, as desired.
ADJUSTING UNIT for making preliminary and final form adjustments.

Providing a swivel action for quick positioning and adjustment, the Superior Adjusta-Brace consists of two units, connected by a 2 x 4, 2 x 6 or a 1" i.d. pipe. Either unit may be attached to the wall form, or to the stake, but it is usually more convenient to use the Adjusting Unit at the stake.

The Adjusting Unit has a patented double-wing nut, working on a 1" diameter rod, with an adjustment of 12". The design of this bracket and the method of attachment are such that it works as a universal joint to take any required position. The companion non-adjusting unit is also designed to take any position that field conditions may impose.

The Superior Adjusta-Brace is light in weight, durable, and inexpensive. Contractors report substantial savings in time and labor compared to the conventional method of bracing.

Write for prices & Bulletin AB-1.



VARIOUS METHODS OF USING SUPERIOR ADJUSTA-BRACE

Nailing brackets may be fastened to stud or wale, and stake.

SUPERIOR
CONCRETE ACCESSORIES, INC.
9301 King St., Franklin Park, Ill.
New York Office
39-01 Main St., Flushing 54, N. Y.
Houston Office
4101 San Jacinto, Houston 4, Tex.
West Coast Plant
2100 Williams St., San Leandro, Calif.

CIRCLE 174 ON READER SERVICE CARD

Tellurometer Instruments Now Have Dual Functions

An improved model of the Tellurometer "Micro-Distancer" (the MRA-2) is said to incorporate a number of major refinements suggested by users of the system under all kinds of terrain and climatic conditions.

Design changes permit interchangeability of units. Each unit may be used as the master or the remote. Thus, readings may be taken from either end of a line. This is in contrast to the first Tellurometer system, which consisted of separate master and remote instruments.

The power pack, heretofore a separate accessory, has been built directly within the instrument body. The size has been reduced to 14 x 10½ x 10½ in. The complete unit weighs less than 30 lb.

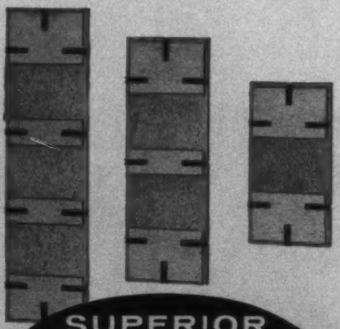
The system is self-contained and has a head set. The parabola converts into a protective cover for the instrument panel. The back-pack is made of heavy-duty canvas on a light-weight aluminum frame. Built-in illumination is said to make the instrument easier to read.

The system can be operated with a standard 12-volt automobile battery or similar power source. TELLUROMETER, INC., 224 DU PONT CIRCLE BUILDING, WASHINGTON 6, D. C.

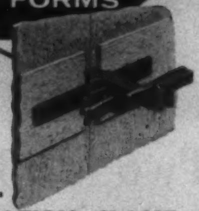
Paving Breaker Can Drive Spikes and Sheeting

A heavy-weight paving breaker has a progressive throttle valve, which is said to simplify starting moils under adverse conditions, bushed front head and throttle valve.

The WB-82 is available with spike driver (for spikes to 1¾ in. heads) and sheeting driver (for wood sheeting to 3 in. thick) front heads, which are interchangeable with the standard paving breaker housing. WORTHINGTON CORP., HOLYOKE, MASS.



SUPERIOR ALL-PLY PANEL FORMS



Only ONE Working Part . . .

THE COMBINATION CLAMP

Aligns and Locks Form, Receives Tie Rod, Holds Liner, and Provides Shelf.

SIMPLICITY — any crew with minimum experience will be able to make fast progress.

ONE WORKING PART — does 4 separate jobs.

ONLY ONE TOOL NEEDED — a hammer.

SUPERIOR All-Ply Panels are used in all types of construction—for forming ordinary residential foundations to intricate high walls.

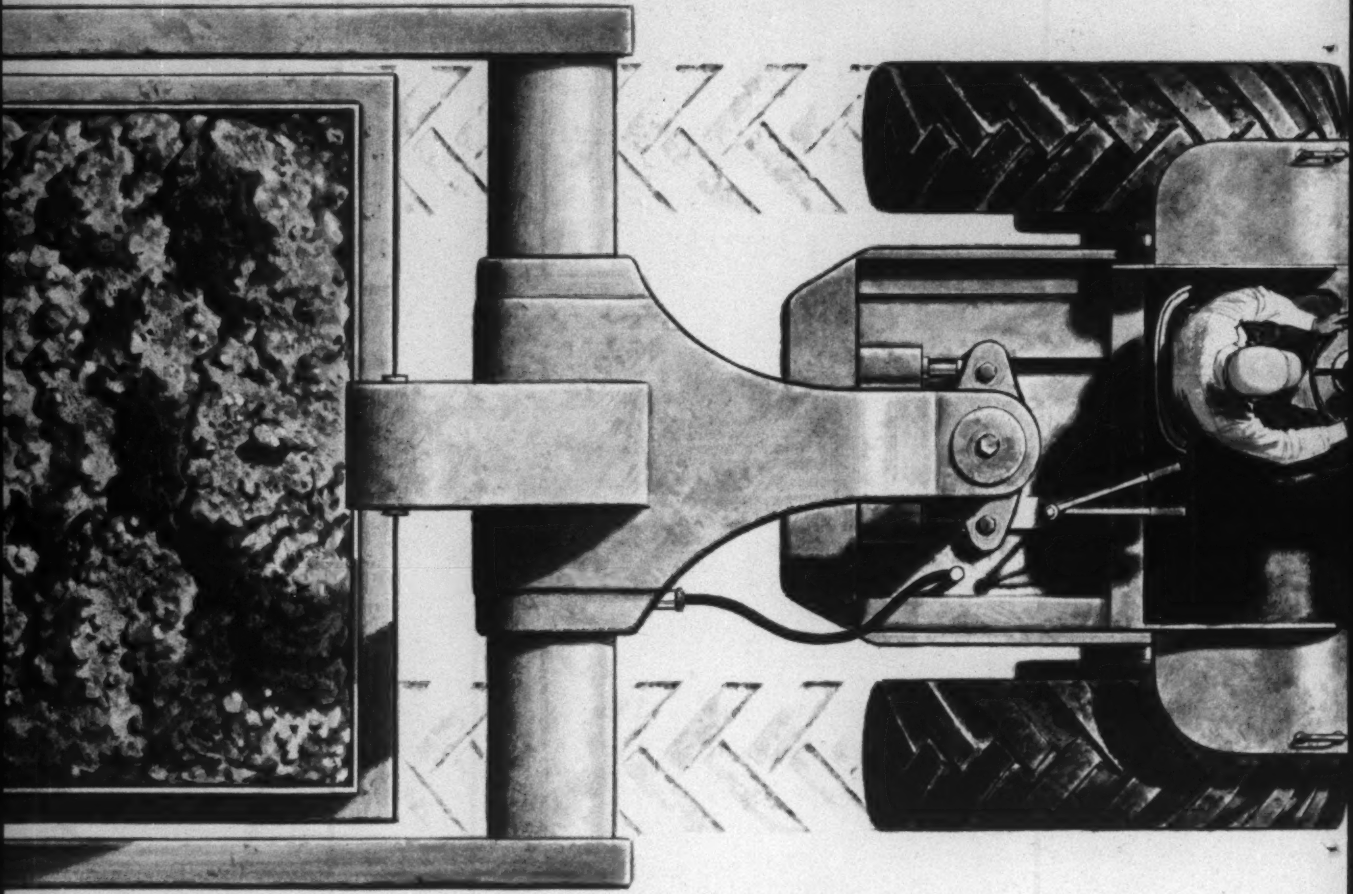
The great strength and rigidity of All-Ply Panel Forms are provided by exterior grade 1⅛" plywood, backed at strategic areas with ½" plywood. Forms weigh less than 5 lbs. per sq. ft. and are easily handled by one man. A hammer is the *only* tool required for erection and stripping. The absence of frames permit easy stacking and transporting in minimum space. Long life and many re-uses are assured.

Write For New 8 Page Bulletin AP-59

SUPERIOR
Concrete Accessories, Inc.
9301 King St., Franklin Park, Ill.
New York Office
39-01 Main St., Flushing 54, N. Y.
Houston Office
4101 San Jacinto, Houston 4, Tex.
Pacific Coast Office and Plant
2100 Williams St., San Leandro, Calif.

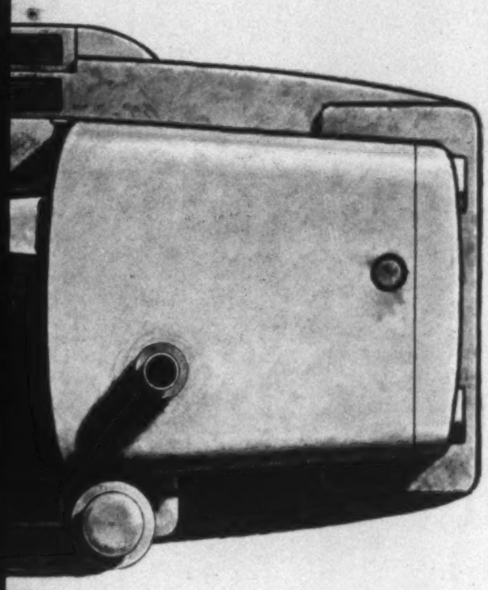
CIRCLE 48 ON READER SERVICE CARD

Think
twice
about
your
power



Carry this handy pocket guide with you—let it help you when you are selecting your new equipment. ➡

CUMMINS



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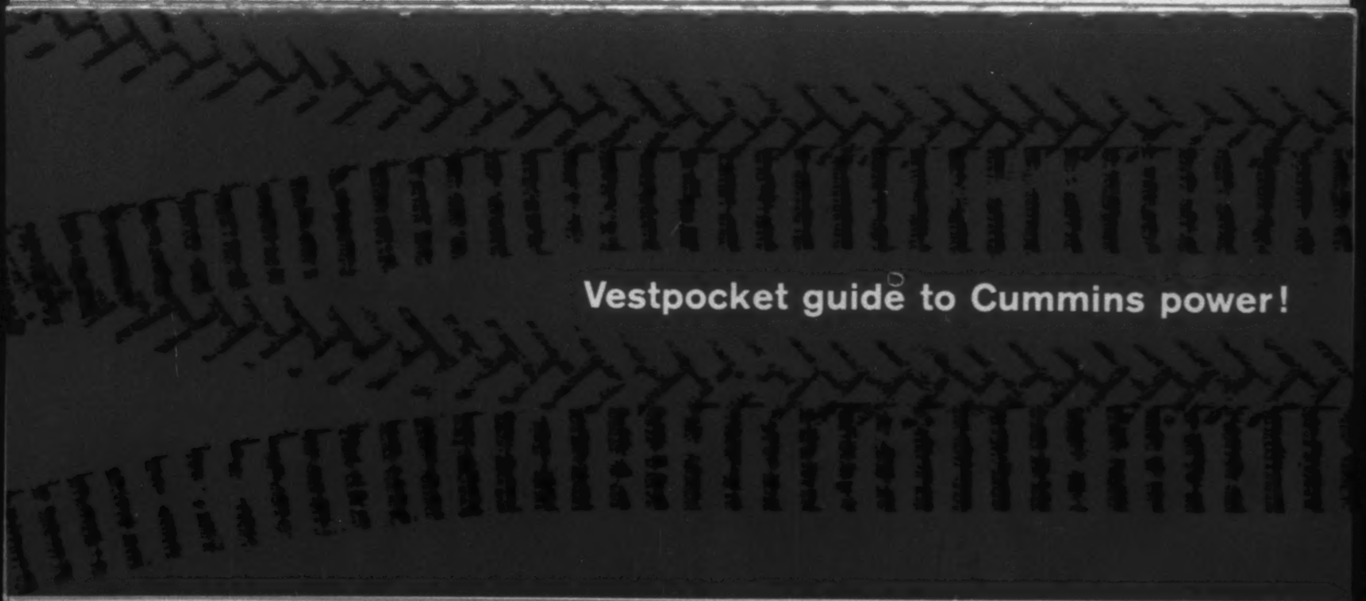
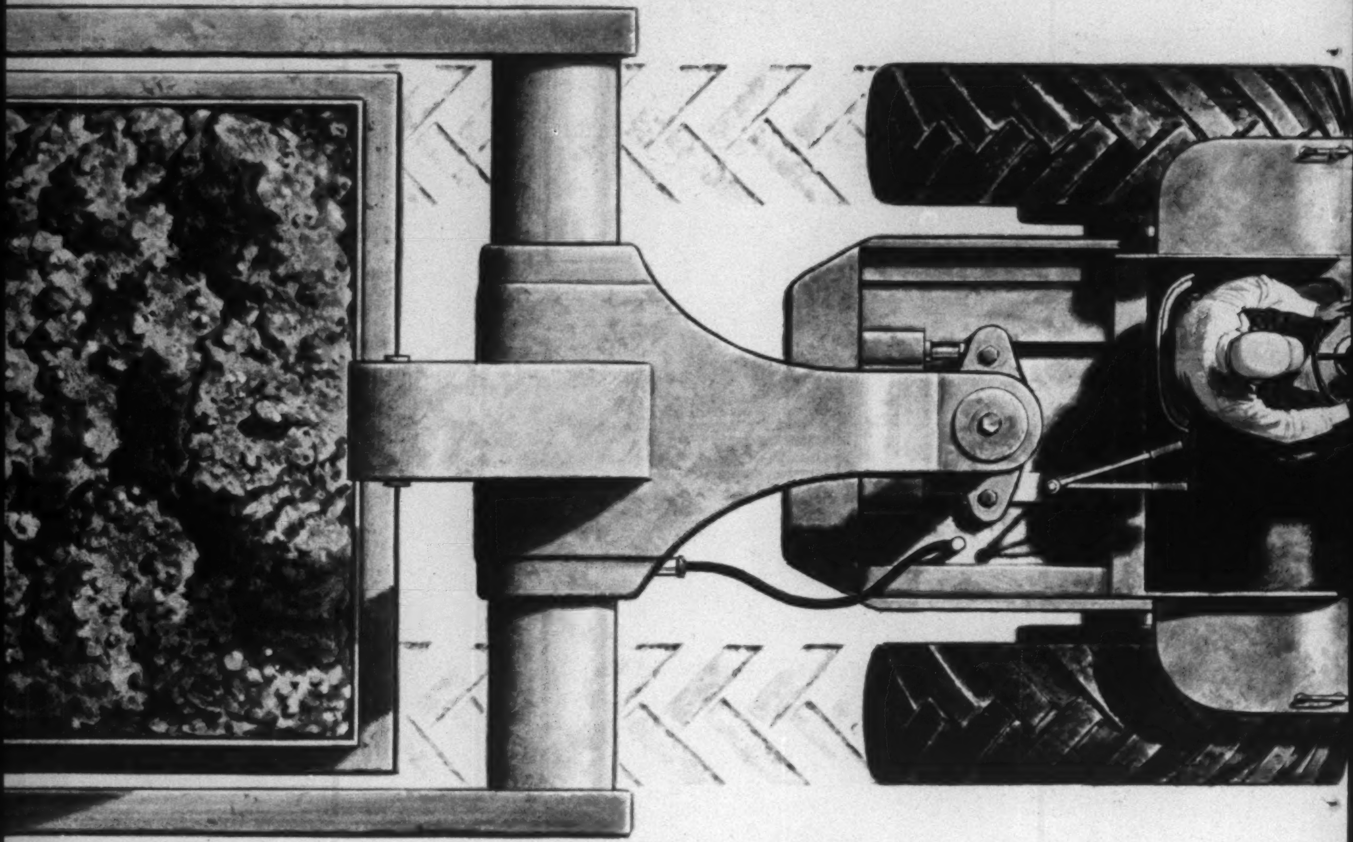
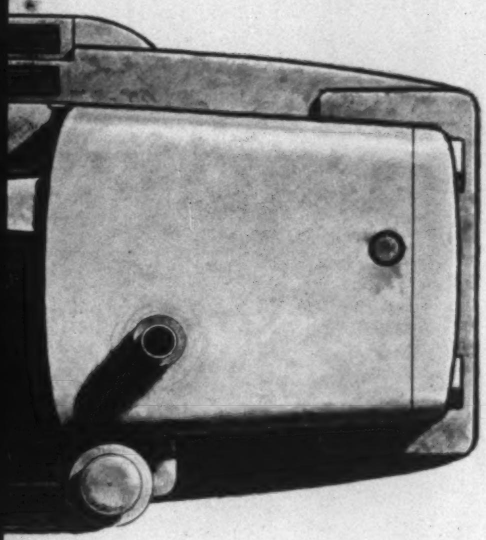


Vestpocket guide to Cummins power!



CUMMINS CONSTRUCTION DIESELS

Engine Model	H.P. @ R.P.M.		Engine Model	H.P. @ R.P.M.	
J-70-BI	70	2000	NH-180-BI	180	2100
J-80-BI	80	2500	HRF-6-BI	190	2000
J-90-BI	90	2000	NH-195-BI	195	2100
J-6-BI	100	1800	NT-200-BI	200	2100
C-105-BI	105	2500	HS-6-BI	210	1800
JF-6-BI	110	2200	NH-220-BI	220	2100
HR-4-BI	115	1800	HRS-6-BI	240	1800
HRC-4-BI	115	1800	NT-6-BI	250	2100
JN-130-BI	130	2500	NTO-6-BI	262	2100
NHC-4-BI	130	2000	L-6-BI	265	1000
JS-6-BI	160	2500	NHS-6-BI	290	2100
H-6-BI	160	1800	NRT-6-BI	300	2100
C-160-BI	160	2500	LR-6-BI	320	1100
NT-165-BI	165	1800	NHRS-6-BI	320	2100
JNS-6-BI	175	2500	NRTO-6-BI	335	2100
JT-6-BI	175	2500	NFT-6-BI	375	2300
C-175-BI	175	2500	LRT-6-BI	450	1100
HR-6-BI	175	1800	NVH-12-BI	450	2100
NT-180-BI	180	2100	VT-12-BI	600	2100



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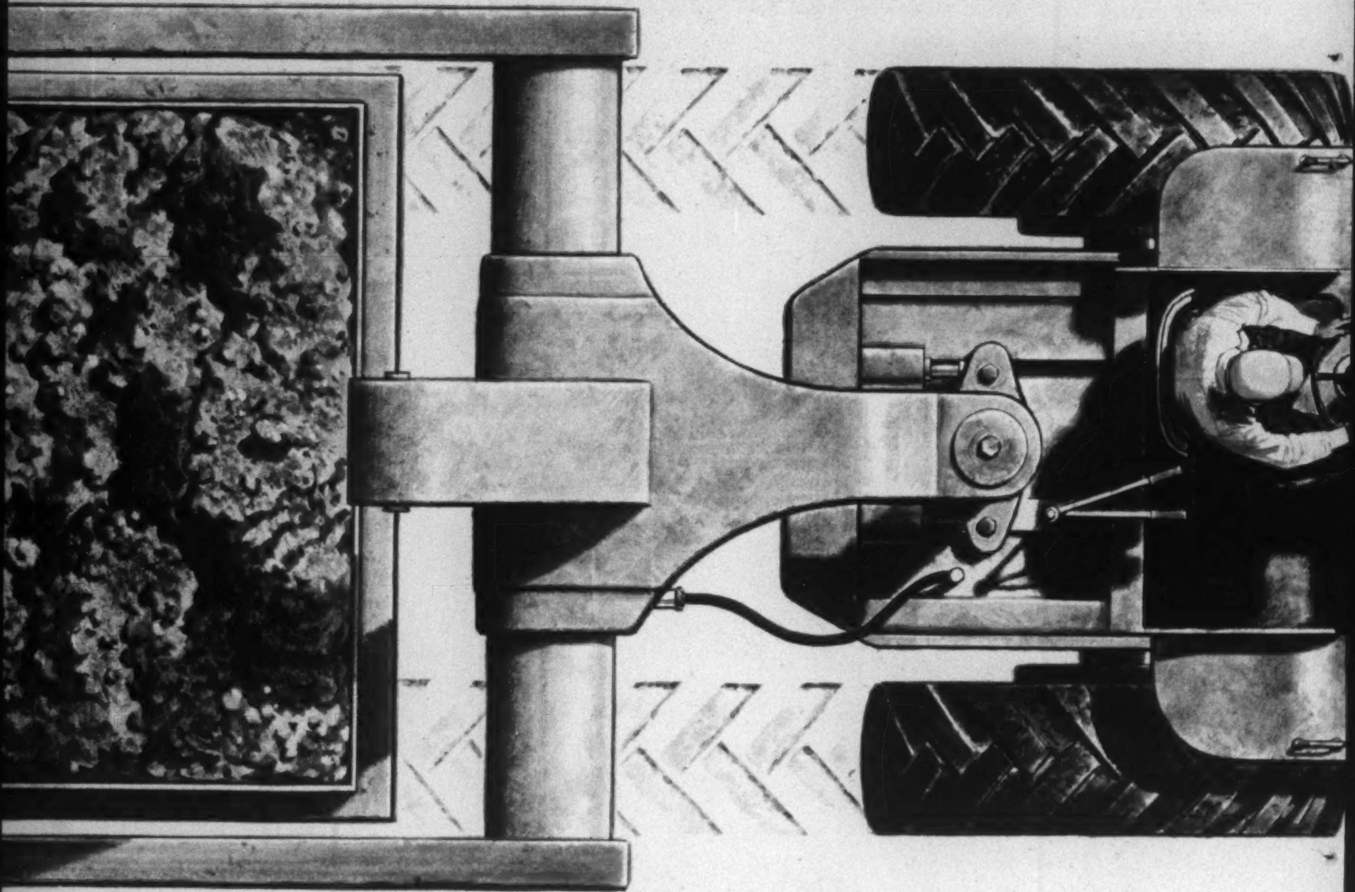
SCRAPERS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Clark (Michigan)	10½ to 27 yd.	175 to 335 h.p.
Curtiss Wright	21 to 27 yd.	240 to 300 h.p.
Euclid	18 to 24 yd.	300 to 335 h.p.
International Harvester	16 to 21 yd.	175 to 262 h.p.
R. G. LeTourneau	Tandem Scraper	335 to 1200 h.p.
LeTourneau-Westinghouse	Tractor Scrapers, 9 to 27 yd.	130 to 335 h.p.
M-R-S	25 to 48 yd.	220 to 600 h.p.
Wagner	5.7 to 25 yd.	110 to 290 h.p.
Westfall	12 to 26 yd.	130 to 335 h.p.



CRANES

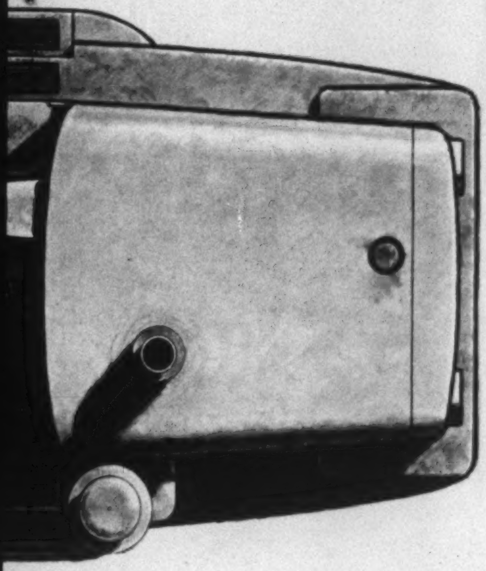
MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
American	30 to 40 ton	115 to 160 h.p.
Baldwin-Lima	30 to 100 ton	220 to 335 h.p.
Bay City	25 to 30 ton	115 to 175 h.p.
Insley	15 ton	160 h.p.
Koehring	Truck Crane	160 h.p.
Link-Belt	15 to 70 ton	130 to 320 h.p.
Manitowoc	Cranes	320 to 450 h.p.
Thew	Crawler Crane	160 h.p.
	Crane, 35 to 75 ton	250 to 262 h.p.

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Northwest	15 ton	160 h.p.
P & H	40 to 100 ton	290 to 600 h.p.
Unit	15 ton	100 h.p.

SHOVELS

American*	¾ to 1¼ yd.	115 to 160 h.p.
Baldwin-Lima	¾ to 4 yd.	115 to 600 h.p.

*Backhoes, clamshells and draglines also available.



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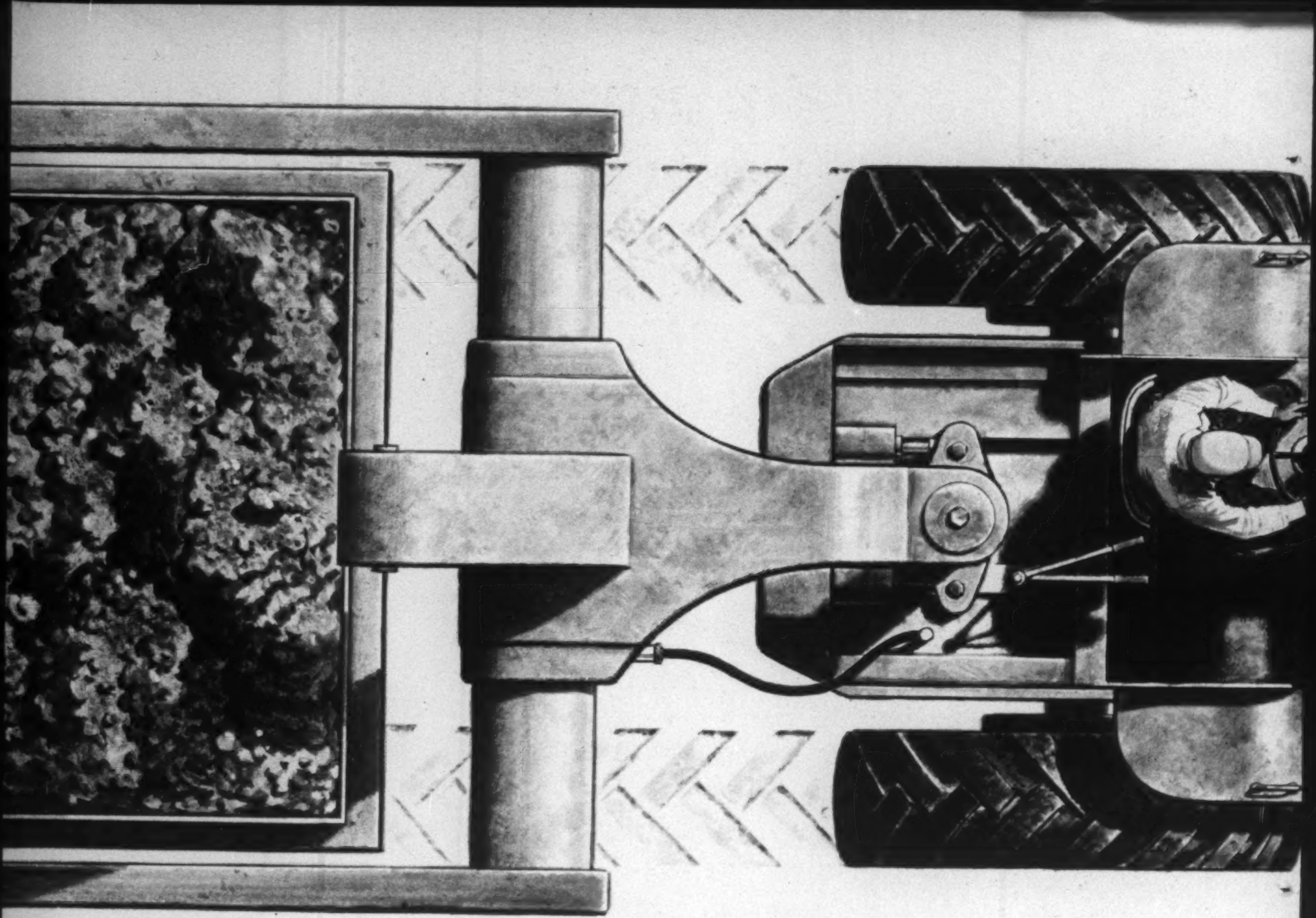
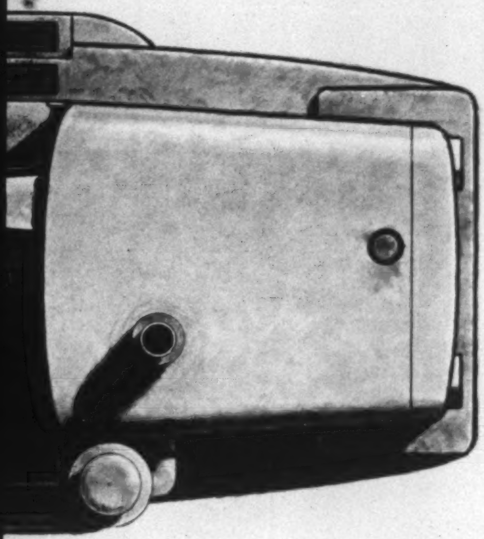
SHOVELS continued

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL	MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Bay City	¾ to 1½ yd.	115 to 175 h.p.	Marion	¾ to 4 yd.	100 to 600 h.p.
Bucyrus-Erie	1½ to 4 yd.	220 to 600 h.p.	Northwest	1½ yd.	160 h.p.
Dominion	1½ to 2½ yd.	220 to 300 h.p.	Orton	Crawler & rail shovels	75 to 240 h.p.
Insley	1 to 1½ yd.	130 to 160 h.p.	P & H	2½ to 4 yd.	290 to 600 h.p.
Koehring	¾ to 3 yd.	160 to 320 h.p.	Thew	⅜ to 2½ yd.	70 to 262 h.p.
Link-Belt	1 to 3 yd.	130 to 320 h.p.	Unit	¾ yd.	100 h.p.
Manitowoc	1 to 3 yd.	160 to 320 h.p.	Warner & Swasey, Gradall Div.	Hydraulic Shovels	100 to (2) 130 h.p.



OFF-HIGHWAY HAULAGE UNITS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
American Coleman	Highway Maintenance Truck	160 h.p.
Autocar	Dump Trucks 6 x 4 Trucks Dump Trucks, 15 to 50 ton	220 to 262 h.p. 175 to 335 h.p. 220 to 600 h.p.
Brockway	Tandem Trucks	180 to 220 h.p.
Cline	Trucks	115 to 335 h.p.
Cook Bros.	Half-cabs, Mixers and Dumps Bottom Dumps Rear Dumps	175 h.p. 220 to 335 h.p. 220 h.p.
Four Wheel Drive	Conventional Trucks, 4 and 6 wheel	175 to 300 h.p.
General Motors Euclid Div.	Rear Dumps, 15 to 55 ton Bottom Dumps, 17 to 25 yd. Coal Haulers, 25 to 51 ton	175 to 300 h.p. 300 to 335 h.p. 220 to 450 h.p.



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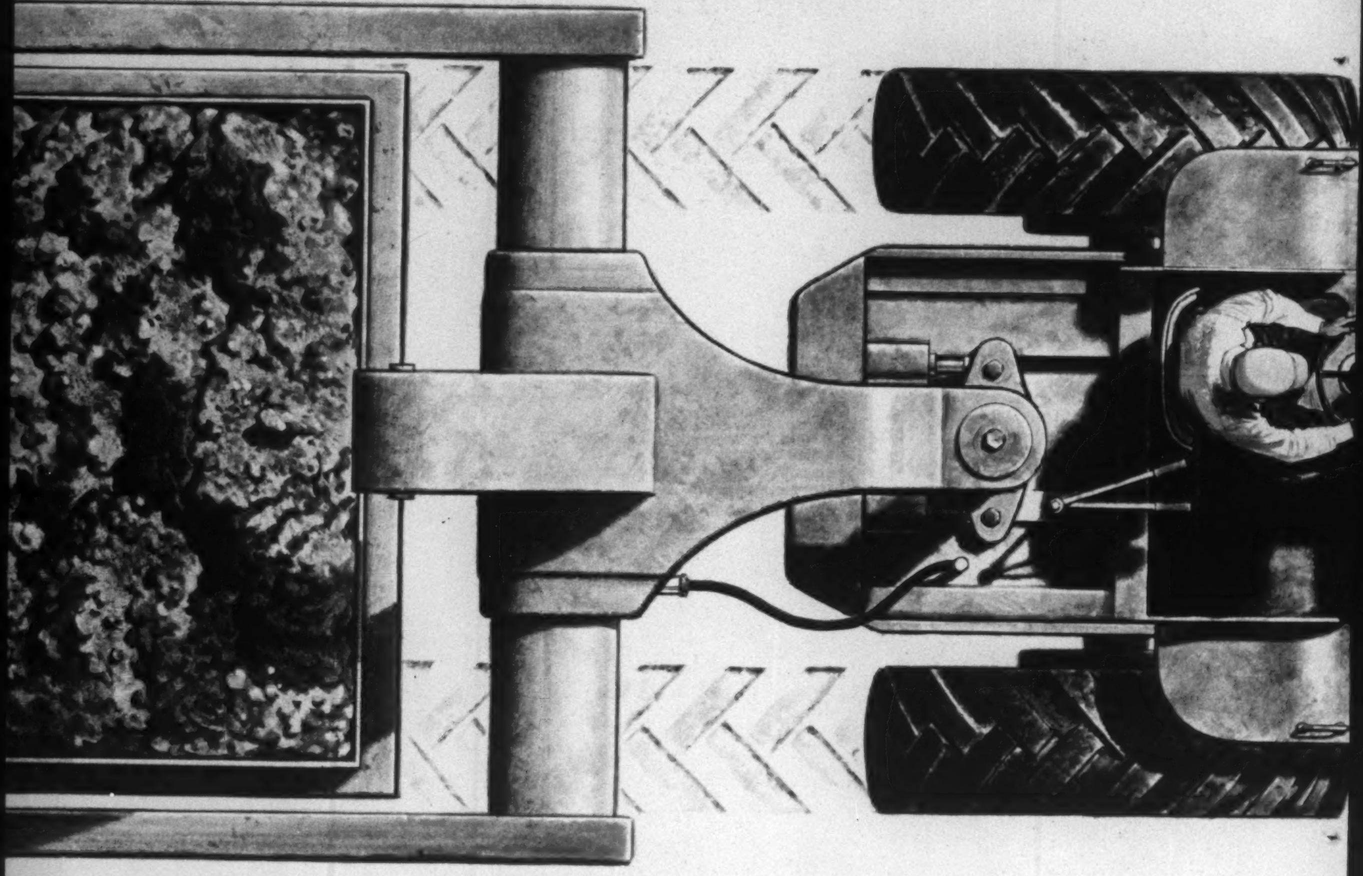
OFF-HIGHWAY HAULAGE UNITS continued

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Hendrickson	Conventional Truck	450 h.p.
International		
(Emeryville)	Trucks	180 to 335 h.p.
(Fort Wayne)	Trucks	175 to 250 h.p.
(Melrose Park)	Payhaulers, 18 to 24 ton	250 to 335 h.p.
K-W Dart	End Dumps, 10 to 50 ton	160 to 600 h.p.
	Shuttle Trucks, 10 to 22 ton	130 to 290 h.p.
	Tractor-Trailer Dumps, 48 to 70 ton	335 to 600 h.p.

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Kenworth	Trucks, 4 and 6 wheel	190 to 335 h.p.
	Rear Dumps, 18 to 36 ton	220 to 600 h.p.
	Semi and Bottom Dumps, 48 to 70 ton	335 to 600 h.p.
Koehring	Dump Truck	220 h.p.
LeTourneau-Westinghouse	Haulpak, 20 to 80 ton	320 to 600 h.p.
Mack	Dump Trucks, 6 wheel	220 to 335 h.p.
	Dump Trucks, 15 to 40 ton	220 to 450 h.p.
	Tractor, 51 ton	450 h.p.
	Tandem Trucks	220 to 320 h.p.
Oshkosh	End Dumps, 22 to 28 ton	300 to 320 h.p.
	Tractor, 50 ton	320 h.p.



OFF-HIGHWAY HAULAGE UNITS continued

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Pacific	Trucks Snowplow	190 to 335 h.p. 250 h.p.
Peterbilt	Dump Trucks	180 to 335 h.p.
Reo	Tandem Trucks	175 h.p.
Sicard	Snow Blowers	130 to 300 h.p.
Walter	Tractor Snow Fighter Trucks, 28,000 to 66,000 lbs.	175 h.p. 190 to 320 h.p. 175 to 320 h.p.
Ward LaFrance	Truck, 100,000 lbs.	190 h.p.
Warner & Swasey, Duplex Div.	Highway Maintenance Truck	130 to 175 h.p.

HOISTS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
American Hoist & Derrick	Hoist	160 to 320 h.p.
Clyde	Hoist	115 to 290 h.p.
Industrial Brownhoist	Hoist	160 to 240 h.p.

MIXERS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Barber-Greene	Mixer	100 to 320 h.p.
Bros, Inc.	Roto Mixer	175 h.p.
Pettibone-Wood	Self-propelled Roadmixer Preparizer	220 h.p. 220 h.p.

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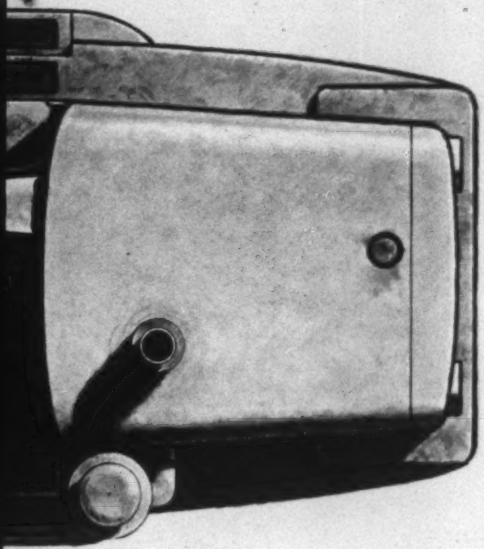

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PAVERS

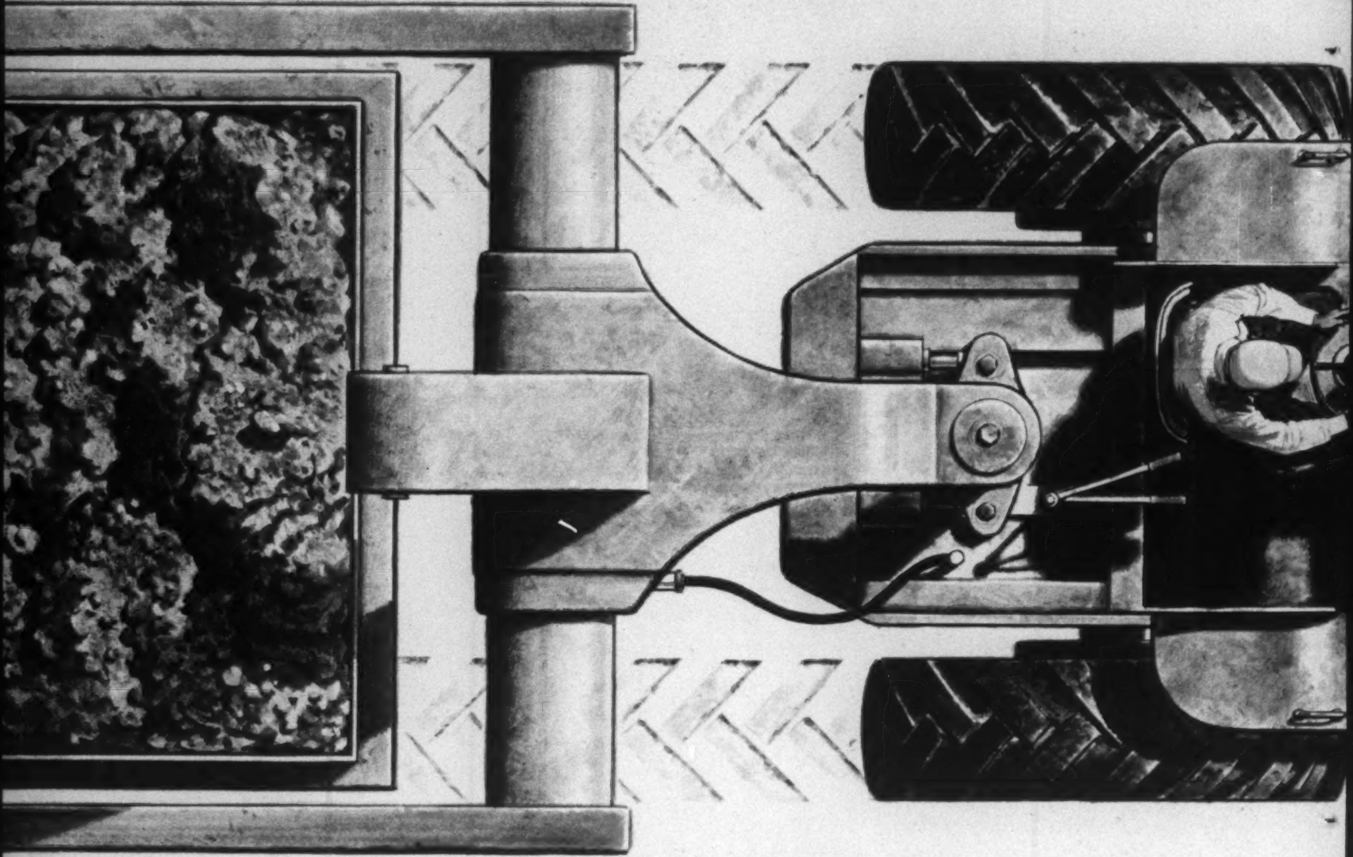
MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Chain Belt Company -Rex Div.	Paver	160 h.p.
Koehring	Paver	160 h.p.
Worthington	Paver	160 h.p.

AIR COMPRESSORS

Chicago-Pneumatic	900 cfm	335 h.p.
Joy	900 cfm	335 h.p.
Worthington	315 to 600 cfm	130 to 220 h.p.

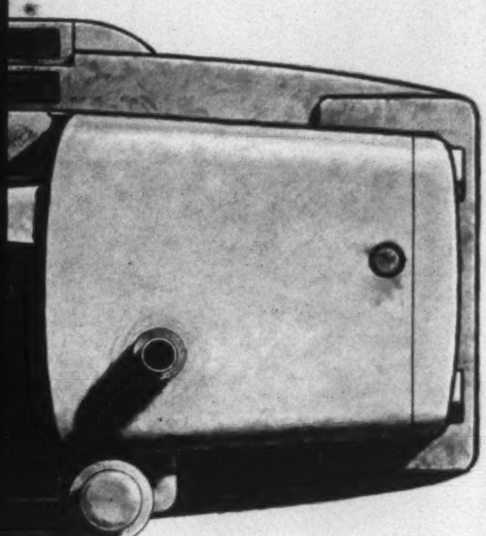
GRADERS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Adams	4 and 6 wheel	100 to 190 h.p.
Austin-Western	4 wheel	110 to 160 h.p.
Galion	4 and 6 wheel	100 to 220 h.p.
Huber-Warco	4 and 6 wheel	130 to 160 h.p.
Pettibone-Mulliken	6 wheel	160 h.p.



TRACTORS, TRACTOR-DOZERS AND TRACTOR-SHOVELS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Clark	Tractor-Shovels 2¾ to 6 yd. Tractor-Dozers, 28,800 to 67,000 lbs.	175 to 335 h.p. 175 to 335 h.p.
Eimco	Tractors, Bulldozers and Loaders	130 h.p.
Hough	Tractor-Shovels	110 to 300 h.p.
LeTourneau-Westinghouse	Tractor-dozers	210 h.p.
Mixermobile	Scoopmobiles, 1 to 6 yd.	80 to 270 h.p.
M-R-S	Tractors	220 to 600 h.p.
Pettibone-Mulliken	Tractor-shovels, 1½ to 3¼ yds.	105 to 175 h.p.
Thew	Moto-loaders	110 h.p.



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TRACTORS, TRACTOR-DOZERS AND TRACTOR-SHOVELS continued

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Wagner	Tractors Tractor-dozers	110 to 320 h.p. 160 to 220 h.p.
Westfall	Tractor-dozers, 16,550 to 40,000 lbs.	130 to 335 h.p.
Yale & Towne-Trojan Div.	Tractor-Shovels, 2 to 4 yd.	110 to 220 h.p.

DITCHERS

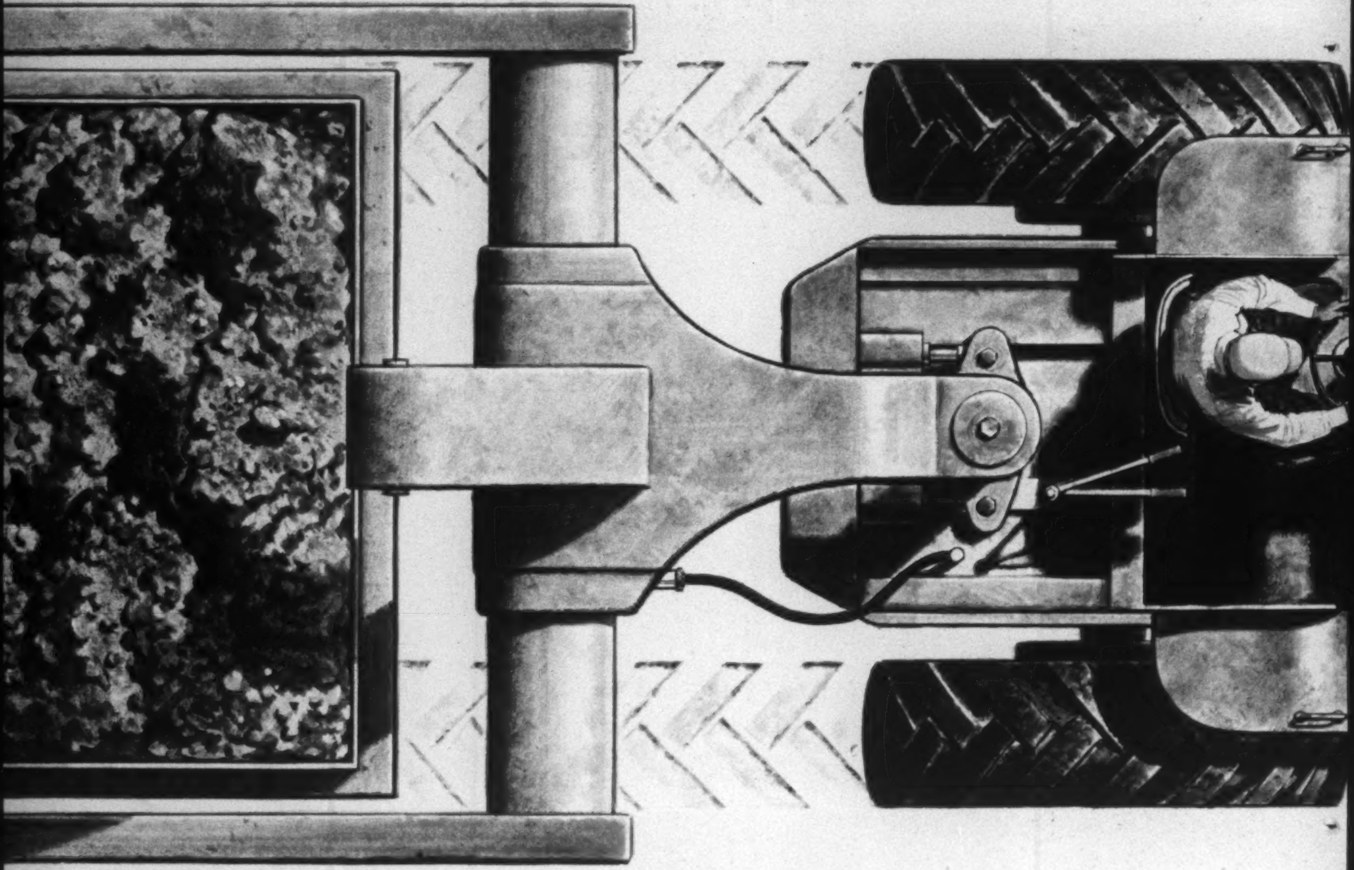
MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Barber-Greene	Ditchers	100 to 320 h.p.

BATCH PLANTS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Barber-Greene	Batch Plants	100 to 320 h.p.
Hetherington & Berner	Portable Bituminous Mix Plant	100 to 450 h.p.

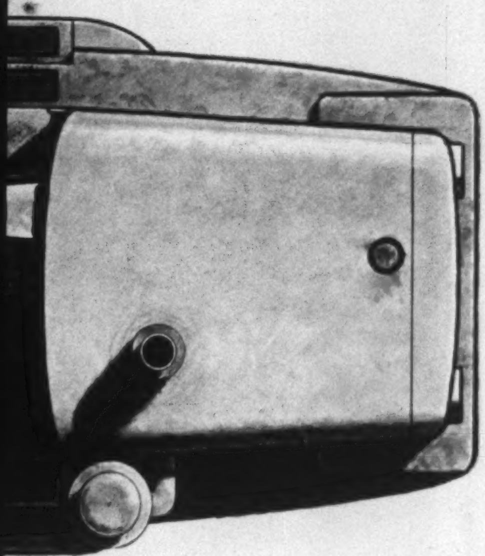
BUCKET LOADERS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Barber-Greene	Bucket Loader	100 to 320 h.p.
Pettibone-Mulliken	Bucket Loader	115 h.p.



CRANE CARRIERS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Baldwin-Lima-Hamilton	20 to 70 ton	175 to 220 h.p.
Crane Carrier Corporation	Crane Carrier	175 h.p.
Hendrickson	6 and 8 wheel	220 h.p.
K-W Dart	25 to 40 ton	175 to 220 h.p.
Thew	Crane Carriers	160 to 300 h.p.
Warner & Swasey, Duplex Div.	4 x 2 to 8 x 4	110 to 195 h.p.



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It's the way Cummins builds their construction diesels. Special design features are incorporated to safeguard performance. Cummins dirt-proofing seals the engine against the entry of dust and abrasives—internal design permits high angular operation.

Further, Cummins gives you the advantages of 4-cycle operation for long engine life, and the Cummins PT fuel system for better fuel economy. In fact, you can save 25%—30% in fuel costs alone over engines of two-cycle design.

But the pay-off comes when you total your operating costs. You'll find your Cummins-powered machines have done more work with less downtime.

There's a Cummins Diesel for every construction application. Thirty-eight engines—from 70 to 600 h.p.—are available in over 300 leading construction equipment models. (See guide below.) It's easy to standardize on Cummins!

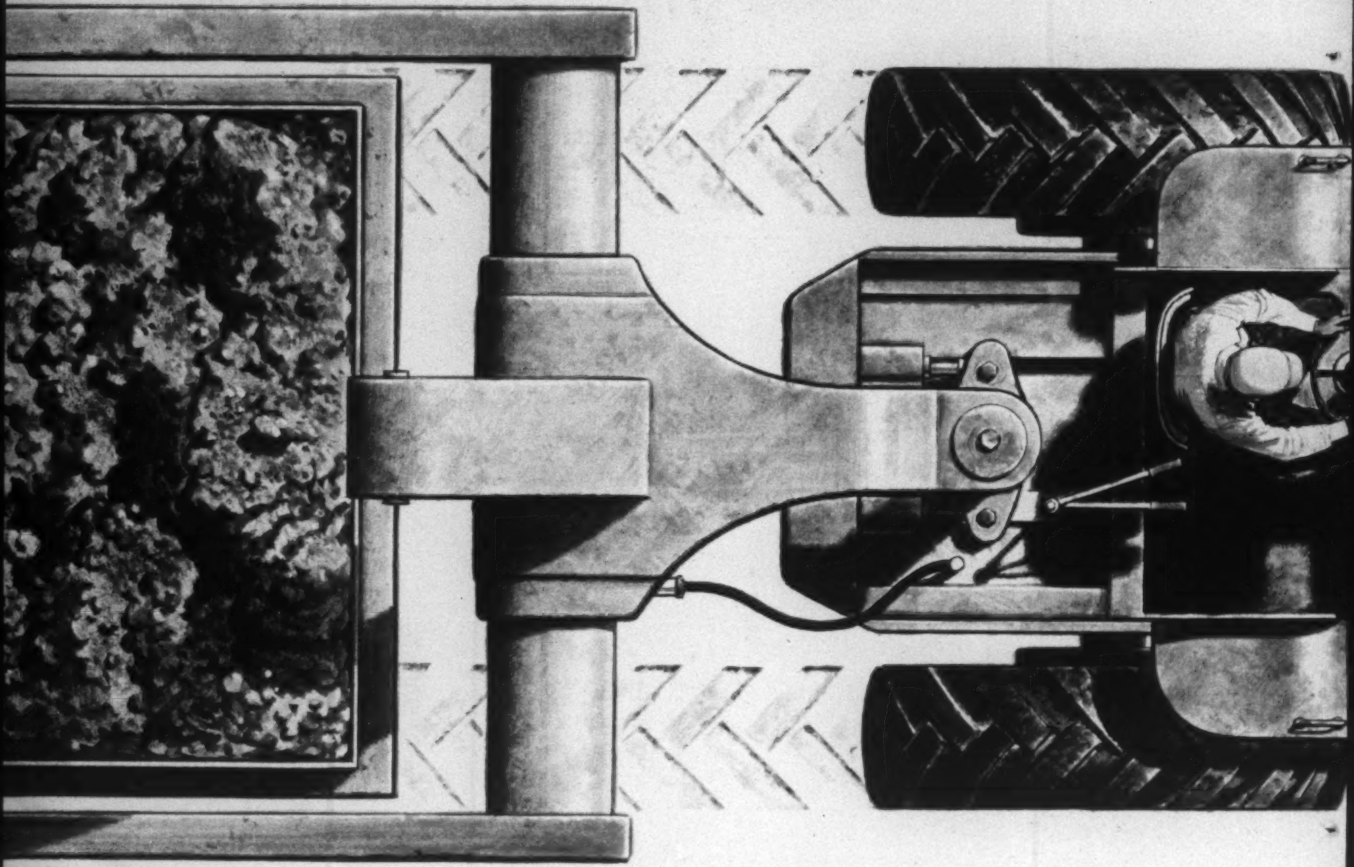
Remember . . . think twice about your power, *specify Cummins.*

DRILLS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Bucyrus-Erie	Rotary Blast Hole Drills	160 to 320 h.p.
Chicago Pneumatic-Reichdrill Div.	Crawler-mounted Blast Hole Drills	160 to 262 h.p.
Davey Compressor	Truck-mounted Drill	160 h.p.
Star Drill Keystone	Truck-mounted Drill	175 h.p.

ROAD ROLLERS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Bros, Inc.	Rubber-tired Roller	130 h.p.
Buffalo-Springfield	Rubber-tired Roller	130 h.p.
Galion Iron Works	Rubber-tired Roller	130 h.p.

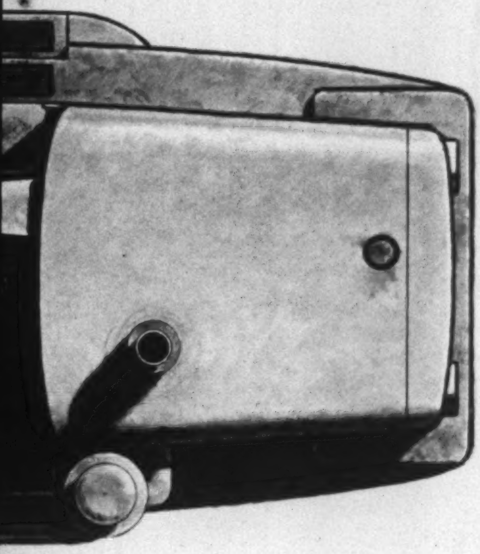


CRUSHING PLANTS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Bros, Inc.	Preparator	240 h.p.
Diamond Iron Works	Crushing Plants	100 to 300 h.p.
Iowa	Rock Crushers	160 to 320 h.p.
Lima-Austin-Western	Portable Crush Plants	100 to 240 h.p.
Pioneer	Crushing Plants	335 h.p.

COMPACTORS

MANUFACTURER	CAPACITY OR TYPE	CUMMINS DIESEL
Bros, Inc.	Compactors	115 to 240 h.p.
Buffalo-Springfield	Compactor	130 h.p.
Wagner	Compactor	220 to 320 h.p.



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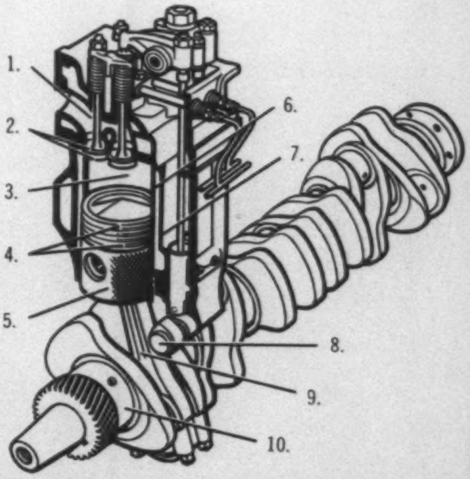
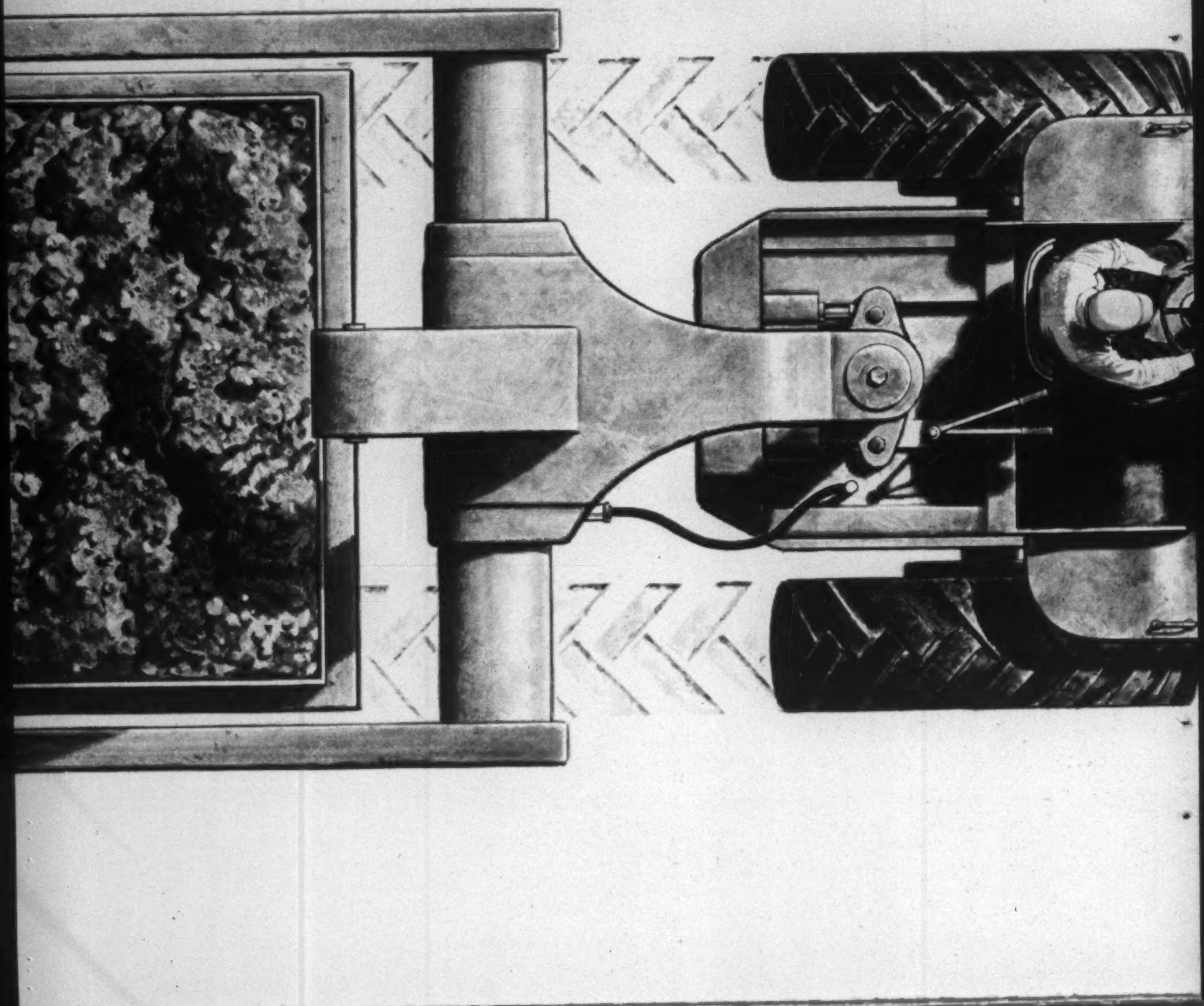
Remember . . . think twice about your power, *specify Cummins.*

CUMMINS INTERNAL ENGINE DESIGN

1. LARGE EXHAUST AND AIR PASSAGES offer minimum restriction to exhaust and air flow.
2. OVERHEAD VALVES are precision machined from high strength alloy steel. Stellite valve seat inserts resist corrosion.
3. OPEN-TYPE COMBUSTION CHAMBER gives most efficient combustion—most power per cubic inch—more power from each gallon of fuel.
4. KEYSTONE COMPRESSION RINGS seal the combustion chamber. Top ring is chrome plated for long life.
5. CAM-GROUND PISTONS assure perfect fit in cylinder at operating temperatures.
6. REPLACEABLE WET-TYPE CYLINDER LINERS dissipate combustion chamber heat to coolant rapidly.
7. LARGE VOLUME WATER PASSAGES give even flow of coolant around cylinder liners, valves and injectors.
8. CAMSHAFT is geared to crankshaft for positive control of all valve and injector movements.
9. CONNECTING RODS are forged from high tensile strength alloy steel. I-beam section gives maximum strength.
10. CRANKSHAFT is precision machined and ground from high tensile strength steel forgings.

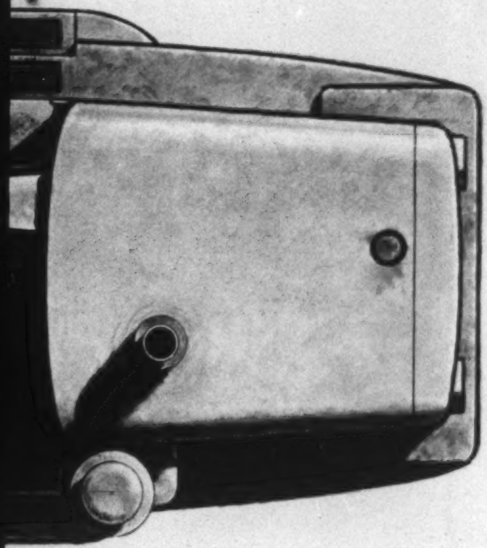




CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

INTERNATIONAL SALES & SERVICE — CUMMINS DIESEL INTERNATIONAL LTD., NASSAU, BAHAMAS — CABLE: CUMNAS
OVERSEAS FACTORY — CUMMINS ENGINE COMPANY LTD. — SHOTTS, LANARKSHIRE, SCOTLAND

Litho in U.S.A. — MP-60



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Remember . . . think twice about your power, *specify Cummins.*

Cummins service is one of the big reasons why more contractors specify Cummins Diesels. ➡

Think
twice
about your
service!

More than 500 service points throughout the United States and Canada are geared to give you fast, efficient help. In addition to these permanent locations, temporary shops and mobile parts and service trucks bring Cummins Service right to the construction site. Service availability is one of the important reasons why leading contractors specify Cummins Construction Diesels for both their American and overseas projects!

Cummins Engine Company, Inc.

Columbus, Indiana

Litho in U.S.A.

Screed Attachment Does Work of Spreading Machine

A power-driven screed attachment, mounted at the rear of a concrete spreader, has been used by Harrison Construction Co. on a section of an Interstate route in Ohio.

Operating at 24-ft width, two pavers and a spreader were used to place the first 6 in. of concrete. Reinforcing steel was positioned and a third paver supplied the top 4 in. of concrete. A second spreader and screed attachment followed the third paver.

Specifications on the project called for a crown of 2½ in., varying no more than ⅛ in. over a 10-ft-sq area. Adjustment was made through a single lever, at one end of the screed, which made corrections through a series of cams. The screed uses an automatic transverse spreading blade to distribute concrete evenly across the pavement.

The 5M screed is supported by a welded double channel beam to support the driving and lift mechanisms; it is designed to extend behind the spreader end trucks. The screed attachment, controlled by the spreader operator, is powered by the spreader's six-cylinder gasoline engine, rated at 58 hp at 1,620 rpm. Blaw-Knox Co., 300 Sixth Ave., Pittsburgh, Pa.

Line of Tandem Rollers Offered by Browning

Now available are 5-8 ton, 8-10 ton, and 8-12 ton tandem rollers. The 8-12 ton model has automotive type power steering.

The buyer has a choice of gasoline or diesel engine with torque converter. A single lever controls the four speeds forward and four reverse. Ballast can be loaded through extra large openings on both sides of both drums. Guide and drive rolls are built on anti-friction bearings, and the machine has extra-duty brakes. Browning Manufacturing Co., San Antonio, Tex.

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The next time you're in Philadelphia take a good look at the

Einstein Medical Center, another installation with LUPTON ALUMINUM

Take a good look at the clean, simple lines of this striking monument to modern-day medicine. Notice how beautifully everything fits—the synthesis of approximately 11,400 sq. ft. of LUPTON Type "H" curtain-wall units, 549 LUPTON "Master" projected aluminum windows, and 732 LUPTON double-hung aluminum windows with the overall architectural concept of the building.

Functionally, LUPTON aluminum construction is consistently economical. All parts are accurately prefabricated and delivered on schedule for simplified, routinized assembly. And lightweight LUPTON construction lowers foundation and framework costs. You get more usable floor space . . . save on maintenance.

Most advantageous of all, though, is LUPTON's dependability. As proven in hundreds of jobs—including the largest aluminum curtain-wall installation in the world—you can depend on LUPTON to meet your specifications, to deliver as scheduled. You can pin-point responsibility, because LUPTON can do the whole job—even install!

See SWEET'S (Sections 3 and 17) for the Michael Flynn Aluminum Curtain Wall and Window catalogs, and write for further specific information. Inquire about LUPTON Comfort-Conditioning*—the new curtain-wall system that cools, heats, and ventilates. A call to the nearest LUPTON representative (see the Yellow Pages under "Windows—Metal") will bring fast action without obligation.

**Trade Mark*

The Einstein Medical Center (Northern Division), Broad Street and Tabor Road, Philadelphia, Pa. Architect: Abraham Levy, Philadelphia. Contractor: James McGraw Co., Philadelphia.

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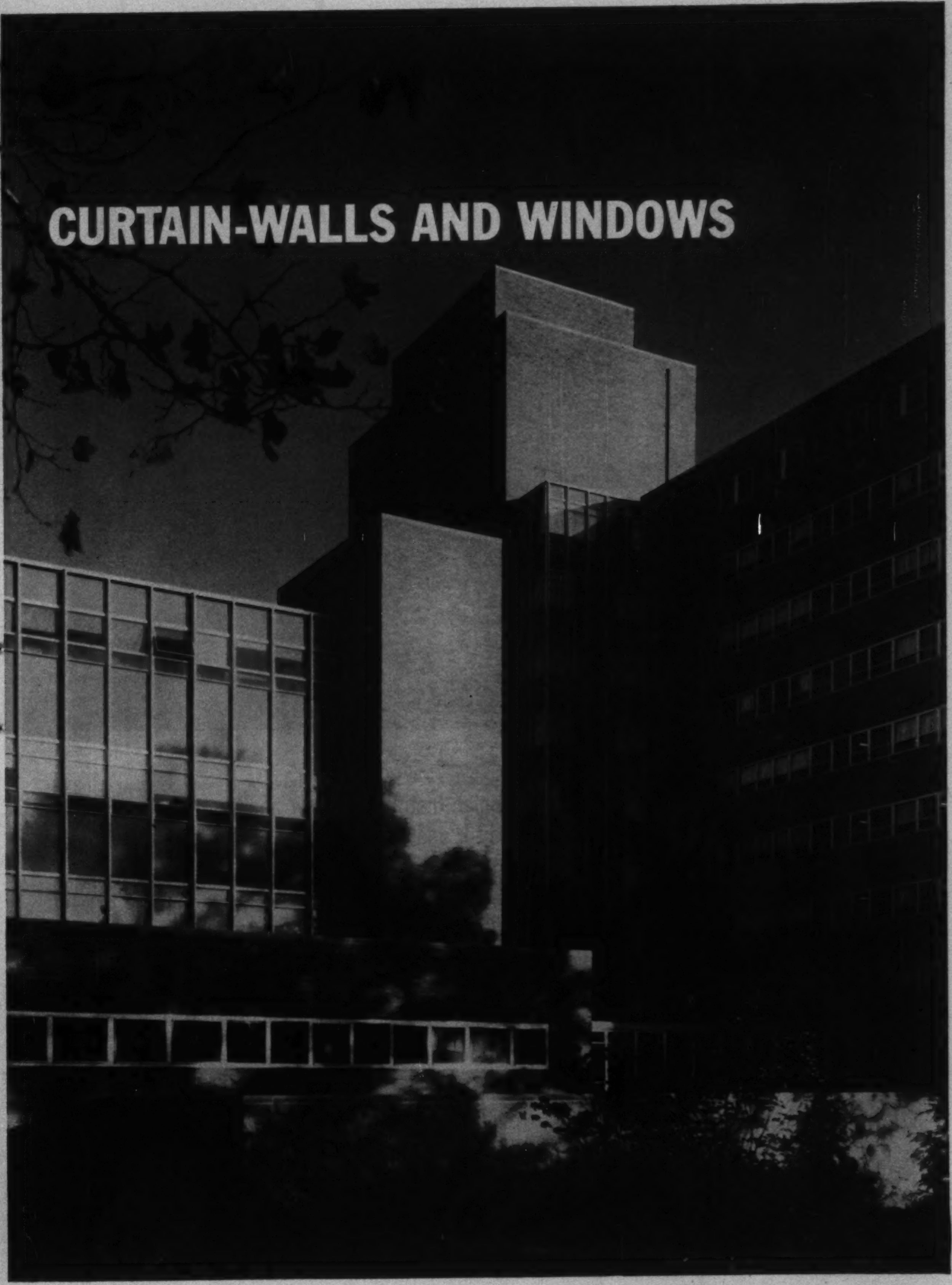

CURTAIN-WALLS AND WINDOWS

CIRCLE 197 ON READER SERVICE CARD

Drive 145,000 ft. of H-Beam Piles

40th YEAR
SPENCER, WHITE & PRENTIS

Owner: General Services Administration, Washington, D. C.
Architects: McKim, Mead & White, New York City
Consulting Engineers: Severud, Elstad & Krueger, New York City

Foundation for Smithsonian Institution's new addition marks first use of H-beam bearing piles for one of Washington's monumental buildings

The above-pictured H-beam foundation—largest in the nation's capital—is one of many installed by Spencer, White & Prentis in that city. The work awarded to us included the dewatering and excavation as well as the bearing piles—2,800 H-beams driven to a depth of 52 ft.

With penetration required through silt, gravel and decomposed rock, H-beams proved most economical and were selected over cast-in-place piles and pipe piles, both of which had also been specified.

Prior to excavation, 2 predrainage sumps lowered the ground water 21 ft. on the 300 x 600-ft. lot located near the Potomac River at the site of an old canal.

Descriptive Literature on Request

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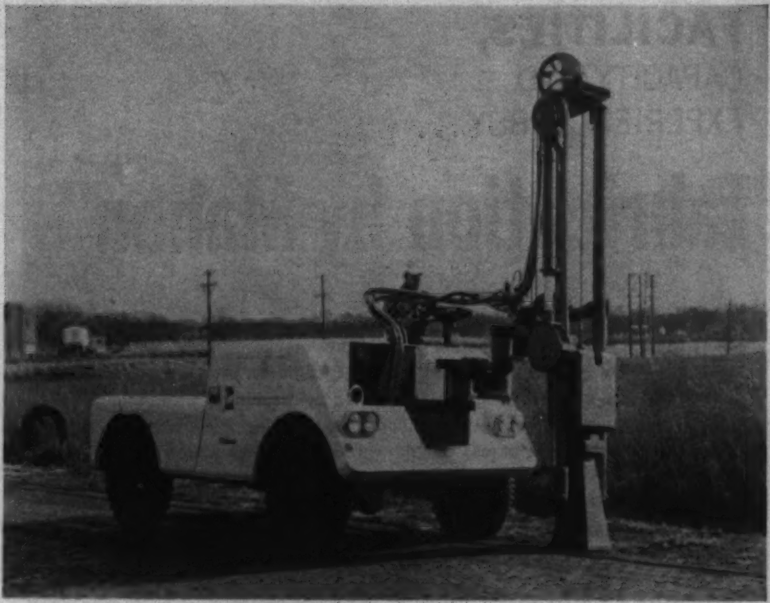


Prime Mover Offers Versatility

A versatile, power-packaged prime mover for medium-heavy construction is a two-axle, pneumatic tired rig designed to handle a complete line of mechanically and hydraulically operated matched attachments that have been in production for a number of years.

They include a backhoe with 14-in. to 36-in. wide bucket and maximum excavating depth of 12.5 ft; pavement-breaker, tamper and pile driver; crane up to 3.5-ton capacity and 360 deg rotation; fork-lift; strato-tower for serving Utilities; sweeper; snow plow and dozer.

Called the Commando prime mover, it turns in a 24-ft circle and has two- or four-wheel drive and steering.

One of its unique features is its shuttle transmission. This is a split torque drive arrangement that permits full power hydraulic creep, a solid direct-drive, or a torque converter drive. It combines the power train characteristics of a tractor with the speed and utility of a truck. Top speed of the 9,200-lb prime mover is 35 mph. YOUNG SPRING & WIRE CORP., OTTAWA STEEL DIVISION, OTTAWA, KAN.

Self-Contained Drilling Rig

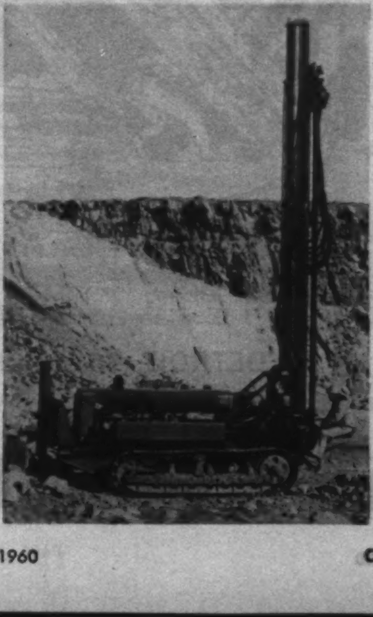
The Model C 42 crawler Rotadrill is a self-contained single unit drill rig. Drilling equipment, air compressor and drill steel capacity for 60-ft-deep holes are on the self-propelled crawler.

The rig is designed for one-man operation. All controls are placed in front of a sulky seat mounted at the drilling station. The operator can drill to 20 ft without leaving the sulky seat. A "Lazy Susan" drill steel rack on the mast holds two additional lengths ready for use.

The crawler tracks have a spread of 7 ft, 8 in. Hydraulic power and hydraulic controls are used throughout the machine. A hydraulic pressure of 1,500 psi can be applied to the hydraulic ram in the mast to produce a down pressure of 12,670 lb.

The machine's compressor produces 250 cfm of air at 100 psi. SCHRAMM, INC., WEST CHESTER, PA.

(*New Products continued p. 201*)



BUILD A CONCRETE MIXER LATELY?

Of course you haven't. It's cheaper and more practical to buy one made by a company whose business it is to make them! You get more for your money. The same is true about pre-fabricated, ready-to-use UNI-FORM Panels compared to wood forms contractors build themselves. For the complete story write:

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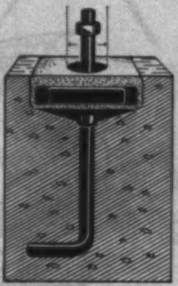

NEW! DECO Anchor BOLT Fitting*

Now avoid wasted time in correcting misplaced bolts. Eliminate hoisting and lowering machine over bolts. Area free for storage or traffic as there are no projections above floor. Adjustability of bolt provides sufficient movement to correct errors made in setting. Malleable iron housing has more strength than its companion bolt. Available in sizes 3/8" to 1½" . . . bolt diameters. See our listing in Sweets. *Pat. App. For.

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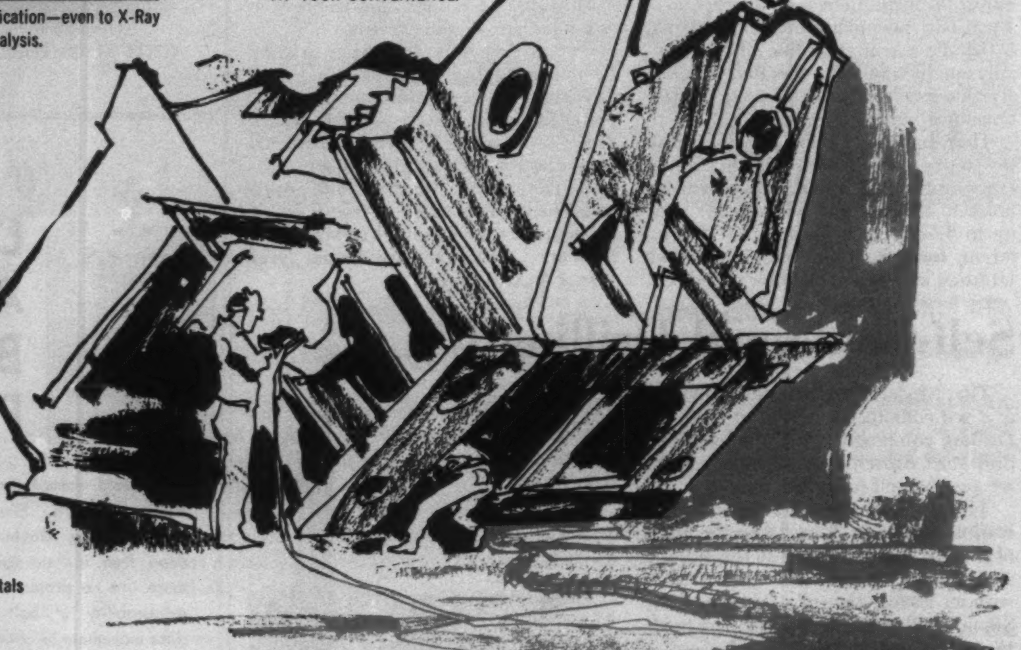

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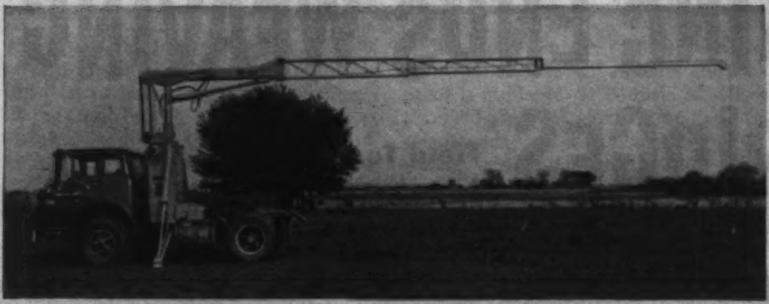
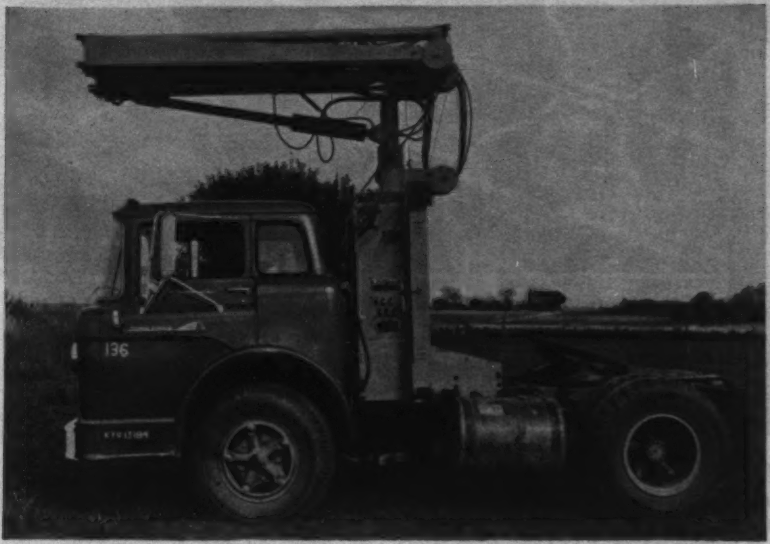


This 40-ft Boom Jackknifes . . .



. . . To 8 ft When On the Road

The fully-hydraulic Versa-Lift 400-R crane has a 40-ft boom. It is made up of five sections and folds up to an 8-ft length for over-the-road movement. The first four sections are hinged to one another for quick, jack-knife folding.

The fifth, or tip, section can be telescoped back into the fourth section, or inserted into the open end of any of the preceding sections for load handling at that boom length. As a result, the boom can be converted to 8, 17, 26, 35 or 40-ft lengths to suit the job. Peale & Co., P. O. Box 308, Omaha, Neb.

Briefs . . .

• **Hand level**—A pocket-size engineering hand level is now available with a draw-focus eyepiece that will provide an extra long sighting plane for the user. The new model is designed to give more accurate leveling and magnifies the bubble level image, according to the manufacturer. The tube's inner surface has been coated to eliminate distracting reflection. The instrument measures 5½ in. with eyepiece retracted and is ⅞ in. in dia. Leupold & Stevens Instruments, Inc., 4445 NE Glisan St., Portland 13, Ore.

• **Hoisting units**—A line of hoisting units can lift scaffold units, climber baskets or power bosun's chairs. The line includes manual, pneumatic and electrically powered models. Ohio Hoist Manufacturing Co., Lisbon, Ohio.

• **Roof deck**—A standard, 24-in.-wide metal roof deck section has been added to the maker's line, bringing to four the number of standard types available. R. C. Mahon Co., East 8-Mile Road, Detroit, Mich.

BURNING UP YOUR PROFITS?

Every time you burn discarded wood forms, part of your profit goes up in smoke too. The lumber left over or wasted on many a job makes an expensive bonfire. Why not put an end to this waste? Write today for the complete story on UNI-FORM Panels—today's better, cheaper way of forming concrete.

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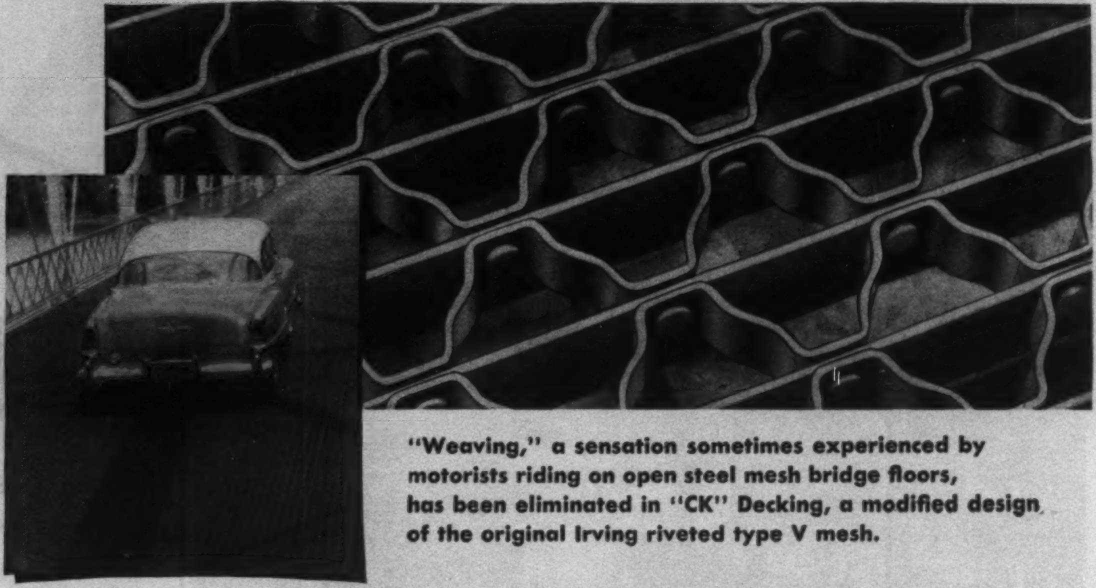
NEW DECKING ENDS WEAVING ON BRIDGES

Field Tested "CK" Decking Gives Improved Riding Quality!



"Weaving," a sensation sometimes experienced by motorists riding on open steel mesh bridge floors, has been eliminated in "CK" Decking, a modified design of the original Irving riveted type V mesh.

THE DIFFERENCE between the "CK" design and the original design, is that the "CK" modification has all the crimped bars of the mesh raised 3/16" above the straight bars. This simple change eliminates the tendency of vehicle wheels to follow the straight bars. It creates a more-open surface pattern which allows tires to sink deeper into the mesh for greater traction.

"CK" Decking has been field tested for over four years. County Commissioners in the test areas have stated that "CK" Decking gives improved riding quality under all types of traffic conditions and weather conditions.

ALSO HAS the ADVANTAGES of STANDARD DECKING which has been giving outstanding service on bridges across the country for more than a quarter century. Those advantages include: safety, durability, maximum strength with minimum weight, self-drainage (won't collect snow or water), and minimum resistance to wind pressure.

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For location of the nearest Irving Sales Engineer consult your local Classified Telephone Directory in principal cities

• **Reverse mounted loader**—The RL-400 reverse mounted loader has a self-loading 1 cu yd bucket with a lifting capacity to full height of 3,000 lb. The bucket is loaded by hydraulic power and doesn't depend upon traction of the tractor, the manufacturer states. HENRY MANUFACTURING CO., P. O. Box 521, TOPEKA, KAN.

• **Self-trailer roller**—Hydraulic operation of self-trailing wheels is offered in the 650-C two wheel tandem roller. Travel wheels can be easily removed. The unit weighs from 4.5 tons to 6.5 tons. ESSICK MANUFACTURING CO., 1950 SANTA FE AVE., LOS ANGELES 21, CALIF.

• **Portable heater**—A new oil-burning portable heater—the Electro-jet—is adjustable to any output up to 400,000 Btus. Push-button control lights the heater instantly and produces heat at up to 500 degrees in 70 seconds, according to the manufacturer. The electrically driven fan delivers up to 2,500 cubic feet of heated air per minute. Fuel-tank capacity is sufficient for 15 hours of operation. ELECTRONICS, INC., VERMILLION, S. D.

• **Bubble buildings**—Two Minnesota inventors have developed a building that starts as a bubble but stands without air support. Reinforced polyester plastic shells are inflated then sprayed for permanenece with a compound that includes glass fiber, cement and clay. After the building is hardened, the air is let out and doors and windows are cut. SPACE STRUCTURES, INC., CHANHASSEN, MINN.

• **Expansion joint**—Flex-Tite, a weather-resistant expansion joint, eliminates cracking in the seams of terrazzo tile and concrete flooring, according to the manufacturer. The joint is made of a synthetic rubber compound bonded between strips of zinc. It is designed to expand or contract with all seasonal temperature changes. FIRESTONE TIRE & RUBBER CO., 1200 FIRESTONE PKWY., AKRON 17, OHIO.

• **Smooth hardboard**—Smooth-on-both sides hardboard will be produced by an air—or dry—process in the eastern part of the country starting this summer at Bowater Board Co.'s plant at Catawba, S. C. The material can be used for lap and panel sidings, interior paneling, wainscoting and underlayment, and wherever hardboard is now applied, according to the manufacturer. BOWATERS SOUTHERN PAPER CORP., CALHOUN, TENN.

• **Clay-pipe joint**—A compression-type joint described as self-aligning and leakproof is available. It consists of polyester fixed rings in the bell and on the spigot ends, and a flexible rubber ring, which acts as the seal. The maker claims the seal is rootproof and acid- and alkali-resistant. NATCO CORP., PITTSBURGH, PA.

• **Leak detector**—A combination pipe finder and leak detector now on the market features completely transistorized circuits. The manufacturer cites use of transistors and printed circuits plus fiberglass case as making instrument lightweight, sturdy and easy on batteries. FISHER RESEARCH LABORATORY, INC., PALO ALTO, CALIF.

• **Portable shear**—The Halto Bar Cropper, a Swedish-made portable shearing machine capable of cutting steel bars up to 2 in. dia, is available on the American market. It runs on electric or gasoline power, delivering up to 90 tons of shearing force through hydraulic pressure. TIDELANDS EQUIPMENT CO., 3625 WESTHEIMER, HOUSTON 27, TEX.

• **In the groove**—The Prescon Corp. has replaced the threads of its former stressing washer with one groove. This speeds and simplifies attachment of the hydraulic jack collar and pull rod. It also reduces chance of damage by rough handling, according to the manufacturer. THE PRESCON CORP., P.O. Box 4186, CORPUS CHRISTI, TEX.

• **Portable sand blaster**—Sand blast generators for cleaning buildings, removing laitance from concrete surfaces, cleaning metal formwork, and other construction uses are available in two and four-wheel models. RUEMELIN MANUFACTURING CO., 3862 N. PALMER ST., MILWAUKEE 12, WIS.

• **Safety belt**—A safety belt designed for workers in high locations meets the requirements of the American Society of Safety Engineers for eliminating body injury caused by the shock load resulting from a fall, claims the manufacturer. The belt weighs only 2 lb. ROSE MANUFACTURING CO., DENVER, COLO.

• **Engines**—Two heavy-duty, six-cylinder engines are the 153-hp UB-264 with 264-cu-in. displacement, and the UB-220 with 220-cu-in. displacement and 112 hp. Both are valve-in-head engines with down-draft carburetion. CONSTRUCTION EQUIPMENT DIV., INTERNATIONAL HARVESTER CO., 180 N. MICHIGAN AVE., CHICAGO 1, ILL.

TRYING TO KEEP UP
WITH LABOR COSTS?

Building wood forms is an endless job. It's like running on a treadmill. After several uses, you've got to start all over and build more. Why spend valuable time, costly labor and expensive material building short-life wood forms when you can use UNI-FORM Panels and cut your concrete forming costs? For the complete story write:

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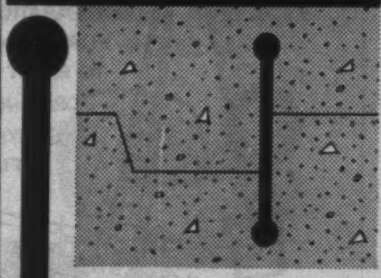
WATERSTOPS
FOR MASONRY CONSTRUCTION JOINTS



RUBBER or VINYL

Williams Efficiency Waterstops are made from Natural Rubber Stock, and designed for maximum effectiveness in any type of cast-in-place construction joint. They will bend around corners—will not crack or tear from shear action. Tensile Test: 3990 lbs.; Elongation Test: 650%. Available in rolls up to 80 feet in length. Field splicing is simple. Williams Waterstops can also be furnished in Vinyl or Neoprene for industrial uses where resistance to oil and other injurious wastes is desirable. These highly effective Waterstops are now in use in hundreds of industrial plants, commercial and public buildings throughout the country.

See Sweet's, or Write for Information.

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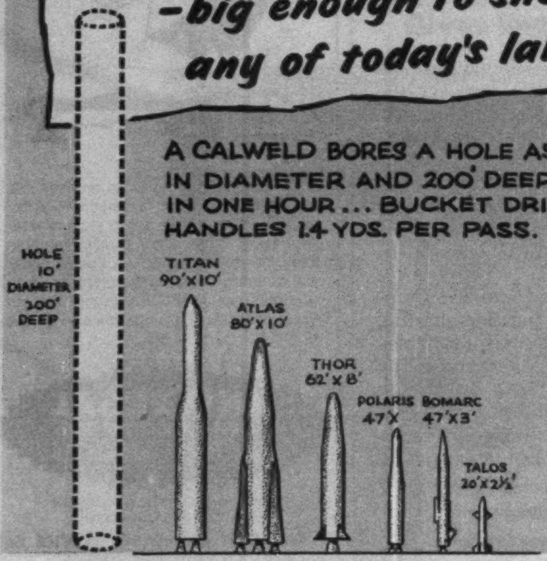
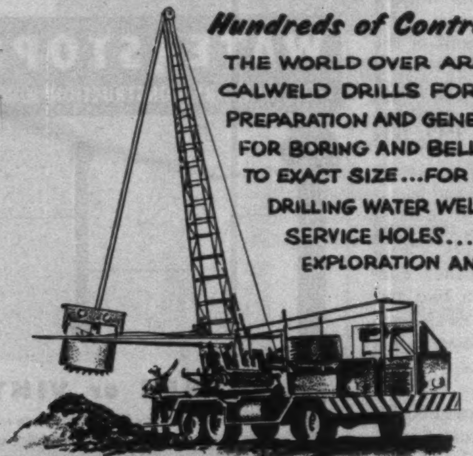
CALWELD digs a big hole!

–big enough to shotgun launch any of today's largest missiles!

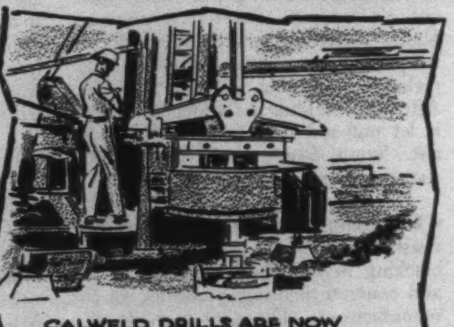
A CALWELD BORES A HOLE AS BIG AS 10' IN DIAMETER AND 200' DEEP! DIGS 45' DEEP IN ONE HOUR... BUCKET DRILL HANDLES 1.4 YDS. PER PASS.





Hundreds of Contractors

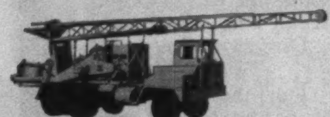
THE WORLD OVER ARE USING CALWELD DRILLS FOR FOUNDATION PREPARATION AND GENERAL EXCAVATING... FOR BORING AND BELLING CAISSONS TO EXACT SIZE...FOR DIGGING MANHOLES... DRILLING WATER WELLS AND OIL WELL SERVICE HOLES... FOR DRILLING EXPLORATION AND TEST HOLES.



CALWELD DRILLS ARE NOW CRAWLER MOUNTED FOR EASY MANEUVERABILITY IN ROUGH TERRAIN. USING THE KELLY BAR CROWD THEY EXERT A 50,000 LB. DRILLING PRESSURE AND PROVIDE 50,000 LB. PULLING POWER FOR PULLING CASINGS (USES HOIST AND CROWD HYDRAULIC CYLINDERS).

Calweld is BIG and does a big job!

DON'T CONFUSE A CALWELD WITH SMALL AUGER-TYPE POSTHOLE DIGGERS. BUCKET DRILLS AND TOOLS ARE INTERCHANGEABLE TO DRILL INTO ALL TYPES OF SUBSOIL FORMATIONS INCLUDING ROCK.



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Men and Jobs

Irving S. Olds

Herbert E. Smith

Two U. S. Steel Directors Retire

Irving S. Olds and Herbert E. Smith retired last month as directors of the United States Steel Corp.

Mr. Olds, a director since 1936, was board chairman of the company for twelve years until 1952. Before becoming chairman in 1940 Mr. Olds served as special counsel for U. S. Steel.

Mr. Smith has been a director of U. S. Steel since 1951 after serving as chairman and chief executive officer of the United States Rubber Company for four years.

He started as a salesman with U.S. Rubber in 1913 and advanced to vice president in charge of sales and distribution by 1929. In 1942 he became president of the organization.

Corps Names District Engineers

Promotions in the Army Corps of Engineers have elevated five colonels to district engineers.

Col. John A. Morrison has been assigned to San Francisco; Col. Andrew P. Rollins, Jr. to Kansas City, Mo.; Col. Julian V. Sollohub to Jacksonville; Col. William B. Strandberg to St. Paul; and Col. Harry G. Woodbury to Omaha.

Colonel Morrison, a native of Ohio, was graduated in 1927 from Ohio State University with a bachelors of civil engineering degree and was commissioned in the Army that same year. He later attended MIT for a master's of science degree in civil engineering. Since 1957, he has been deputy to the assistant chief of engineers for troop operations.

Colonel Rollins has been chief, planning group, military assistance advisory group in Vietnam and is returning to the U.S. in October to take over his new post.

Colonel Rollins graduated from A & M College with a bachelor of science degree in civil engineering and from California Institute of Technology with a master's degree.

Colonel Sollohub moves to Jacksonville from St. Louis where he has been commanding officer of the engineering supply control office. A native of Scotia, New York, he holds degrees from West Point and from the California Institute of Technology.

Colonel Strandberg has been serving as deputy engineer inspector general in Washington since 1958. Before that he was on assignment in Japan.

Colonel Strandberg was also chief of the civil engineering department, engineer research and development laboratories at Fort Belvoir, Va., from 1952 to 1954. He was graduated from West Point in 1937.

Colonel Woodbury returns to the U.S. to take over his new position from the Ryukyu Islands and Okinawa where he has been assistant chief of staff since 1957. He graduated in 1938 from Rhode Island State College with a degree in electrical engineering.

After the war, he served on the staff and faculty of the Engineer School at Fort Belvoir. Later he received a master's degree from MIT.

(*Men and Jobs continued p. 207*)

MISSING ANY PANELS?

Ever wonder why you never recover all of your forms when a job is completed? They're often destroyed . . . cut up to fit . . . broken . . . damaged in handling . . . burned for firewood . . . used as ramps or otherwise mis-used and abandoned on the job site. A UNI-FORM Panel can't be sawed up or broken. For the complete story write:

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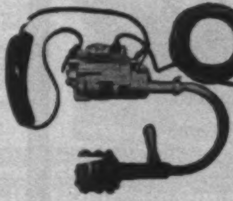
"BERG"
CONCRETE SURFACER
MODEL A



"BERG" equipment is used extensively for surfacing and finishing applications on concrete construction.

The many "BERG" Models available permit exact selection for your particular application.

The distinctive "BERG" features give you the kind of results that are realized in better quality work, combined with lower costs.

"BERG" Heads and Attachments are interchangeable, thereby providing adaptability for vibrating, wire brushing, sanding and polishing applications.

THE CONCRETE SURFACING MACHINERY CO.
4667 SPRING GROVE AVE.
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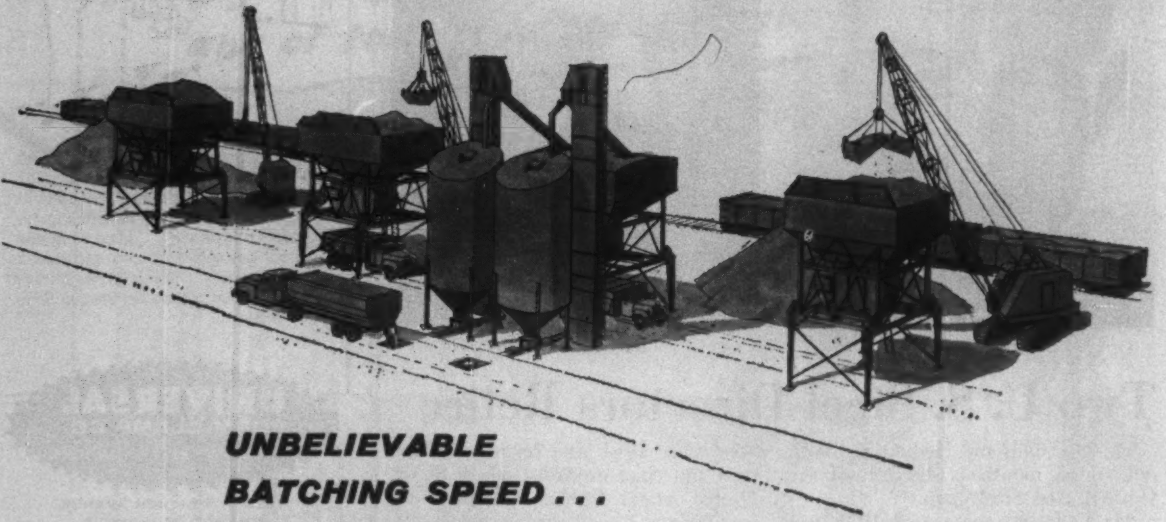
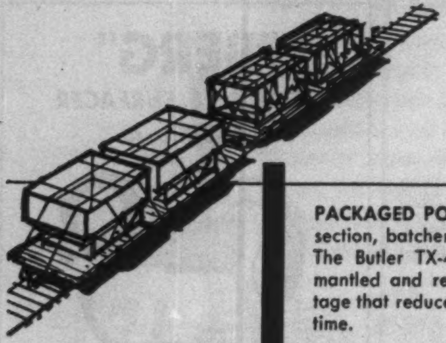
As Batching Records are Broken...

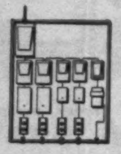
BUTLER WILL BREAK THEM



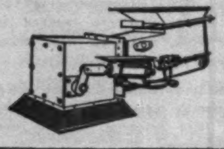
UNBELIEVABLE
BATCHING SPEED . . .
EXTREME ACCURACY . . .
PACKAGE PORTABILITY . . .



PACKAGED PORTABILITY (bin in one section, batcher in another)
The Butler TX-4 can be rapidly dismantled and re-erected — an advantage that reduces profit-robbing downtime.



SERVICE ENTRANCE PANEL
This comes in a weatherproof steel cabinet. All circuitry is installed ready for use so you have none of the usual expense of field wiring.



AIRFLOMATIC CEMENT FEEDER
Precision feeding, day after day, is yours with the Butler Airflomatic Cement Feeder. No moving parts except a stream of air on which the cement literally rides.

The past year has seen new world's records established and broken — perhaps half a dozen or more — and all with the BUTLER TX-4 Roadbuilders Plant.

Yet all those records are far, far short of the production levels possible with the TX-4. That's why when the next record comes along, it will be set with BUTLER equipment.

There are many reasons. Faster, fool-proof automation . . . batching faster than trucks can be spotted. Split-pound accuracy with no mistakes.

And portability that puts fat, extra savings in the roadbuilders bank account.

BUTLER BIN COMPANY
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California Bridge Expert Retires

Frederick W. Panhorst, California's chief bridge engineer for the past 29 years, will retire April 1.

State Highway Engineer J. C. Womack has appointed James E. McMahon to succeed Panhorst. Mr. McMahon has been in charge of the department's branch office in Los Angeles since 1953 as Bridge Engineer–Southern Area.

Dale F. Downing has been promoted to replace McMahon.

Since his appointment as department head, Mr. Panhorst has been responsible for the planning, design, construction and maintenance of approximately $1 billion in bridge and tunnel projects, including hundreds of separation and interchange structures for the state's expanding network of freeways.

Such complex structures as the parallel Carquinez Bridge on U. S. 40, the Webster Street Tube in Oakland, the Benicia-Martinez Bridge and all of the state's elevated freeway structures have also been planned by the department and undertaken during this period.

He began his career with the California Division of Highways in 1927, after serving several years with the Washington State Highway Department. He became Acting Bridge Engineer three years later. Mr. Panhorst became permanent Bridge Engineer in 1936 and attained his present civil service rating, Assistant State Highway Engineer–Bridges, in 1947.

Mr. Panhorst is a past national director of the American Society of Civil Engineers, and is a former president of its Sacramento section.

Frederick W. Panhorst

He is a member of the Structural Engineers Association, the American Concrete Institute, the American Association of State Highway Officials, the American Road Builders Association, and the American Toll Bridge and Turnpike Association.

He recently served as chairman of the committee responsible for long-range investigation of landslides in the Pacific Palisades-Santa Monica area under terms of special 1957 legislation.

Careers

Business

J. S. Thomas joins McKee-Berger-Mansueto, Inc. construction cost consultants. Mr. Thomas, who manages the company's new Chicago office, has been with Frederick R. Harris, Holland, Mich.

Edward H. Sokolowski is now chief engineer of the San Antonio office for Vogt, Ivers Seaman and Associates. He has been project engineer.

Maurice J. Day takes over the newly created post of vice president-commercial for the Crucible Steel Company of America, Pittsburgh. Mr. Day, who has been vice president-technology, is now responsible for sales management.

Harry E. Porter is regional field sales manager of the Pittsburgh Corning Corp. He supervised sales activities in the Southwest and West Coast areas.

Karl A. Gardner takes over as vice president, engineering for Yuba Consolidated Industries, Inc., Palo Alto, Calif.

Max Bookman and **R. M. Edmonston** have established civil engineering offices in Glendale, Calif. where they specialize in hydraulic engineering. Mr. Bookman was district engineer in Los Angeles and Mr. Edmonston, principal hydraulic engineer at Glendale. Both were with the California Department of Water Resources.

Albert Andrews is president of the American Standard industrial division, Detroit. He succeeds **John W. Brennan** who heads the engineering and development of the corporation's air conditioning and related product lines. Mr. Andrews joined the firm in 1950 and more recently was vice president and controller of the industrial division.

A. B. Gloster is the Louisville & Nashville Railroad's new maintenance of way engineer at Louisville. He has been with the railroad since 1936 and has been division engineer.

(*Men and Jobs continued p. 209*)

FORMING GIVE YOU A HEADACHE?

Sometimes, concrete forming *can* be a headache. But, when you put your problems to our concrete forming experts you can solve them quickly and efficiently. At no cost, we will study your job, provide a detailed cost estimate, prepare preliminary form details, bill of material and give you our recommendation for construction procedure. Why not take advantage of this free service? Send us a set of plans today, we'll do the rest.

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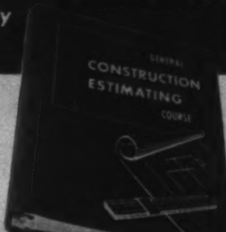

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This Pipe is EXTRA Strong . . . EXTRA Safe

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The NAYLOR Wedgelock coupling makes a positive connection, securely anchored in standard weight grooved ends. A hammer is the only tool needed to connect or disconnect it.

NAYLOR Spiralweld pipe provides the practical way to get the economy of light weight without sacrifice of strength in your pipe lines.

Because of its exclusive lockseamed-spiralwelded structure, this distinctive pipe provides greater strength plus extra safety against shock loads, stresses and strains. And you get these advantages along with the light weight that saves time, work and money on handling and installation.

For air, water and ventilating lines, it will pay you to get the facts on NAYLOR pipe as well as on NAYLOR Wedgelock couplings. Just write for Bulletin No. 59.

NAYLOR PIPE *Company*

1248 East 92nd Street, Chicago 19, Illinois

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Public Works

T. Dye Barnhouse is deputy director of operations for the Ohio Highway Department after serving for 25 years as a division engineer.

Robert E. York has been named Boston building commissioner. Mr. York, a retired Army colonel, directed the building of the Ledo road from Burma into China during World War II.

Dean Larrabee is director of public works at Pueblo, Colo. He had been public works director at Waterloo, Iowa, and more recently was an engineering consultant at Colorado Springs.

Frank M. Clinton takes over from **E. O. Larson** as director of Region IV of the U.S. Bureau of Reclamation. Mr. Larson is retiring after 39 years with the bureau. Mr. Clinton joined the bureau in 1937 and has been assistant project engineer at Billings, Mont.

Thomas E. Maxson, assistant city engineer for Memphis, has been promoted to principal civil engineer in the Department of Public Works.

Arthur D. Bishop has been named chief engineer of the Vermont State Highway Department. He has been with the department for 38 years and has been head of the bridge division since 1924.

Kendall Moultrop, associate professor of civil engineering at the University of Rhode Island has been appointed deputy chief engineer of the Rhode Island division of roads and bridges.

William E. Rawlings has been named project manager of the Columbia Basin Irrigation project in Washington. He had been a supervisor of irrigation for the reclamation bureau's regional office at Billings, Mont.

Gerald J. McCarthy is the new chief of the office of design for the Michigan state highway department. He joined the department in 1948 after graduation from the Michigan School of Mining and Technology and since 1958 has been a senior district engineer.

Ernest Marples, British minister of transport, has disposed entirely of his holdings in Marples, Ridgeway and Partners, British engineering-construction firm.

G. W. Schlutius has become president of the Mississippi Valley Structural Steel Co., Chicago. He succeeds **E. T. Blix,** who has retired, but continues as a director. **J. C. Arntzen** is now executive vice president in charge of sales.

Richard C. Diehl has joined Koppers Co., Inc., Pittsburgh, as vice president in the engineering and construction division. He had been vice president-operation, of Universal Cyclops Steel Corp.

Gemmill C. Davis has been appointed urban co-ordinator of the Pennsylvania State Highway Department. He was regional design engineer with the U. S. Bureau of Public Roads at Hagerstown, Md.

Phil R. Nalder has been assigned to Afghanistan to supervise construction, operation and settlement of Helmand Valley project, a development of the Bureau of Reclamation. He joined the Bureau in 1933 and in 1952 was named project manager of the Columbia Basin Project at Ephrata, Wash.

L. V. Downs has been transferred to Boise as regional engineer for the Bureau of Reclamation. He has been assistant project manager at Ephrata, Wash. on the Columbia Basin project.

Walter Schilling is the new director of the National Capital Regional Planning Council, Washington, D. C. He has been chief planner of the Toledo Plan Commission.

Henry C. Wolfe, retired brigadier general of the Corps of Engineers, has been named chief of the division of navigable waters of the North Carolina State Water Resources Department. Since his retirement in 1950, he has been practicing engineering in Washington and New York. He has also been connected with the construction of an airfield in Paraguay.

Raymond D. Goller, Columbus architect, has been appointed chief of the Columbus department of building regulations. Before starting his own architectural firm, he was associated with Edward Kromer, Columbus public school architects, and the Allied Architects Association. He is also past president of the Columbus chapter of the American Institute of Architects.

Ernest Geissler is the new Lewis County, Wash., engineer at Chehalis. For the last two years he has been public works department engineer at Montclair, N. J.

Richard A. Brunel and **George W. Harris** have been promoted in the New Hampshire public works and highways department. Mr. Brunel who was assistant design engineer, has been apointned design engineer. Mr. Harris takes over as the new assistant planning and economics engineer after serving as road inventory supervisor.

Theodore J. Kauer is the new director of public works for Ohio. He is a former Ohio highway director and from 1952 to 1955 was chief engineer for the Ohio Turnpike Commission.

C. Taylor Burton has been named director of the Utah State Highway Department. He succeeds **Elmo R. Morgan** who is now as vice president of the University of California.

(Men and Jobs continued p. 212)

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TIGHT, SOLID BASE

Corruform speeds concreting—provides tight, solid base for concrete, permits slab to be cast and finished in one operation. No wood forms! Just place Corruform...unroll mesh...place concrete. No costly cleanup on floors below. Easy! Fast! Economical! Capitalize on Granco's leadership in modern floor and roof systems.

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STAY-IN-PLACE BRIDGE FORMS
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PAVEMENT JOINTS

LIGHT, RIGID SHEETS

Lightweight Corruform sheets (10 to 20 lbs.) are easy to carry, handle and place. You cover up to 24½ square feet per sheet. Two or three men can place up to 10,000 square feet of Corruform a day! Tough-temper sheets act as centering, prevent lateral pull or strain on joists.

SAFE WORKING PLATFORM

When welded to joists, Corruform provides a safe, strong working platform. Sheets take normal construction abuse. No punctures. No concrete leakage. Corruform is incombustible. No fire hazard!

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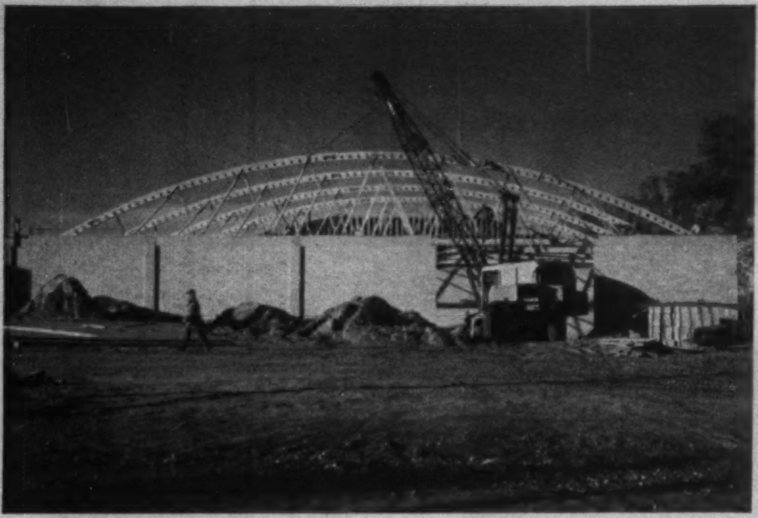


George Hammond Bowling Alley, St. Paul, Minn. Constructed with 4 Rilco laminated wood bowstring trusses 101'8⅝" in span, spaced 20' o.c.; 4 beams up to 48' in length.

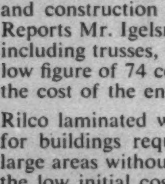
Complete RILCO Roof for Only 74 Cents Per Sq. Ft.

After completing these two bowling lanes contractor E. E. Igelsrud, Eckardt Co., Inc., Minneapolis, Minn., was pleased with the cost-saving and construction features of Rilco laminated wood structural members. Reports Mr. Igelsrud: "We found that the cost of erecting the Rilco roofs, including trusses, beams, columns, joists, deck and labor, amounted to the low figure of 74 cents per square foot. This was a great factor in reducing the cost of the entire structure."

Rilco laminated wood members lend themselves to any design, are ideal for buildings requiring clear span construction. They gracefully cover large areas without need of supporting posts. And, as Mr. Igelsrud found, the low initial cost and easy erection of Rilco laminated wood members reduce the final cost of the structure.

Rilco service engineers will be happy to consult with you, without obligation. Write for further information.

Diamond Lake Bowling Lanes, Minneapolis, Minnesota. Constructed with 6 Rilco laminated wood bowstring trusses 101'6" in span, spaced 20'4" o.c. Six beams 41'8" in length, 6 columns 12' long.



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Retirements

Garnet Graham Willis retires after 40 years with the Bureau of Reclamation. Since 1952 he has been construction and maintenance supervisor of the Bureau's Yakima, Wash., project.

Col. M. H. Carter, secretary-treasurer of the Louisville Sewer District has retired. He came to the District in 1954 as assistant secretary-treasurer and is a veteran of 31 years of army service.

W. Guy Gunn has resigned as managing director, contractors division of the American Road Builders Association to join the staff of the Associated Pennsylvania Constructors.

John A. Dickinson has retired as chief of the codes and safety standards section of the National Bureau of Standards. Mr. Dickinson, a mechanical engineering graduate of Stevens Institute of Technology, joined the Bureau in 1919 as a safety engineer. In 1941 he was made assistant chief of the codes and specifications division and was appointed to his last position in 1955. Mr. Dickinson has also received the American Museum of Safety's Arthur William Memorial Award for his work in the safety field.

Howard E. Isham, vice president and treasurer of United States Steel Corp., has retired. Mr. Isham joined U.S. Steel in 1958 as audit supervisor of the former Carnegie-Illinois Steel Corp. He rose in executive positions until 1952, when he was appointed assistant treasurer. He started his business career with the Sherwin Williams Co. in Cleveland in 1912.

Josiah C Chadwick, dredging inspector with the Wilmington Distrct of the Army Engineers, has retired after 32 years wth the office.

Percy Briton Shipley, resident engineer for the Maryland State Roads Commission, has retired.

Charles E. Neville has retired as Lewis County, Wash., engineer after 36 years of service. He has been county engineer since 1943.

Frank B. Cook has retired after 25 years with the Bureau of Reclamation. His latest position was chief of the general engineering branch. From 1938 to 1945 he was head of a liaison group between the Bureau's central design headquarters at Denver and field construction forces throughout the western state. During this time Mr. Cook was responsible for coordination work on the Grand Coulee Dam.

Lewis Whitfield, engineer for the North Carolina Highway Department since 1953, has retired after 41 years.

G. H. Seybolt, principal civil engineer with Ebasco Co., retired after 29 years.

(*Men and Jobs continued on p. 214*)

Brinson-Allen's No. 14 is equipped with Preco Automatic Blade Control. This exclusive factory-installed attachment for all Caterpillar Motor Graders saves money on a wide range of applications. With the desired slope set on the dial, the operator only has to control depth of cut. The transistorized unit automatically maintains blade slope within ⅛ inch in ten feet.

CAT NO. 14 MOTOR GRADER INCREASES PRODUCTION 20 PER CENT

This Cat No. 14 Motor Grader handles subgrade and base on the western approach of the Interstate System highway bridge between Tampa and St. Petersburg, Fla. Charlie Clyatt, superintendent on the job for owner Brinson-Allen of Tampa, reports, "We have increased production about 20 per cent. The No. 14 has more weight, traction and power, gets the job done quicker. It has never failed to stay well ahead of the base crew."

Here's why the big No. 14 excels in weight, power and traction: It weighs a hefty 29,280 lb. . . . the 150 HP turbocharged engine delivers power to spare . . . 14:00-24 tubeless tires all around provide excellent stability. The 12 ft. (standard) or 14 ft. (optional) moldboards with ample throat clearance between moldboard and circle assure you of greater loads than ever before.

But this versatile motor grader has more than sheer power and weight. Features like the dry-type air cleaner which removes 99.8 per cent of the dirt from intake air means longer service life. The exclusive Caterpillar oil clutch, which operates up to 2000 hours without adjustment, practically eliminates down time for clutch repair. Operator has excellent visibility to front wheels, toe of blade and circle. The power steering and power brakes are designed for operator efficiency and high productivity. These are just a few of the reasons why the No. 14 is the most profitable and productive motor grader in its class.

Heavy-duty circle and moldboard on the No. 14 provide big load carrying capacity. Circle and moldboard are strong to match engine power and can absorb the punishment of rough work. Mechanical blade controls provide precise, fast blade adjustment and positive hold.

See your Caterpillar Dealer and ask him to demonstrate the No. 14 on the toughest application *you* can find. See for yourself how the rugged No. 14 can handle the hard work.

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- SCREENLESS
- RUGGEDLY BUILT
- NON-CLOG IMPELLER

THE ECONOMICAL SEWAGE PUMP with the *NON-CLOG impeller!*

This WEIL Screenless Heavy Duty Non-Clogging Sewage Ejector is ruggedly built for years of trouble-free operation. WEIL Pumps of this design are still operating satisfactorily after 25 years of service.

This unit is completely factory assembled, economical to install — only one piping connection is required. Pre-assembly and factory testing insure LESS installation time and no "call-back" servicing.

Inherent in the design of this pump is an ample reserve of strength to meet the most severe conditions. The ease and simplicity of installation and the record of many years of trouble-free operation make this pump the logical choice with the engineer, contractor and owner.

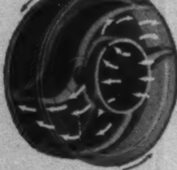

Fig. C-9001

This Two Blade NON-CLOG Impeller is the most important part of the screenless non-clog sewage pump. Not only does it effectively handle large diameter solids but it also passes rags and stringy material of various lengths which are washed into the sewage pit. Pumps with this impeller successfully handle difficult pumping jobs such as waste from public toilets, canning plants, hospitals and industrial installations.

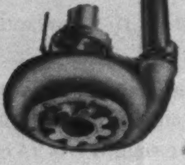

Fig. C-9021

This rugged pump casing with wide waterways permits unobstructed passage of the maximum solids handled by a non-clog impeller.

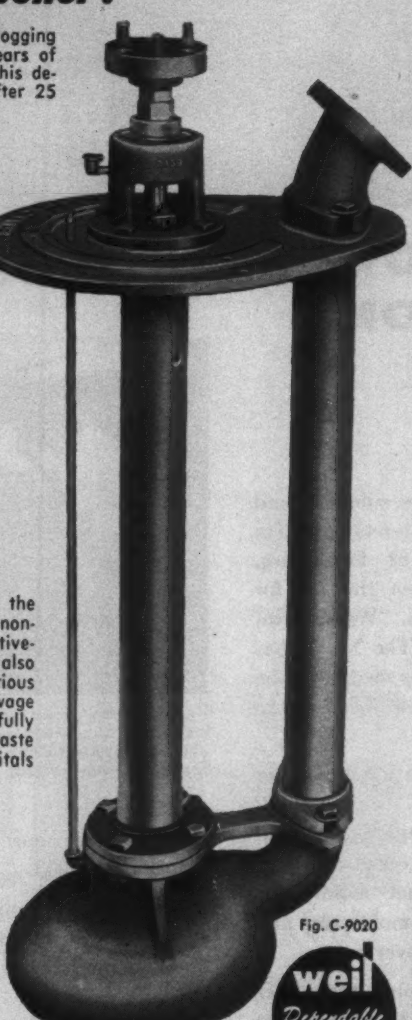

Fig. C-9020

weil Dependable PUMPS

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Bulletin C-900 E

weil PUMP CO.

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Associations

Donald V. Buttenheim, president of Buttenheim Publishing Corp., New York City, is the new president of the Construction Industry Manufacturers Association.

State sections of the Associated General Contractors have elected **George A. Lowe** president of the Iowa group and **Don Berg** president of the Wyoming section.

New presidents of the Hawaii and Wisconsin sections of the American Society of Civil Engineers are **Wayne E. Duncan** and **Henry B. Wilschut** respectively.

Kenneth S. Wilder has been elected president of a new organization, the Rhode Island Building Officials Association. The group represents municipal building officials in the state.

B. S. Colburn Jr. leads North Carolina society of professional engineers.

James D. Caulfield, Portland consulting engineer, is the newly elected president of the Professional Engineers of Oregon.

Don N. Schneider, home builder of Fullerton, Calif., has been elected president of the Building Contractors Association of California.

Frank A. Clauson has been elected president of the Long Island Home Builder Institute. He is one of the founders of the association and has been treasurer for the past two years. Mr. Clauson succeeds **Alexander Paulsen** who is now chairman of the board.

New president of the Vancouver Association of Professional Engineers is **H. P. J. Moorhead,** vice president of Powell River Co. In Ohio the Society elected **Wayne E. Ault,** and in Wyoming, it's **Lewis D. Weight.**

Max T. Morton is the new president of the Colorado Associated Building Contractors.

J. M. Soules has been elected this year's president of the Canadian Construction Association. Mr. Soules is with the Robertson-Yates Corp., Ltd., Port Credit, Ont.

Herman A. Moench, dean of Rose Polytechnic Institute is the new chairman of the Indiana State Board of Registration for Professional Engineers and Land Surveyors.

Ralph B. Goodrich is the new president of the Vermont Roadbuilders Association.

Bernard J. Gaffney has been elected president and **Jay M. Gorey,** vice president of the American Association of Cost Engineers.

Mansell L. MacLean, president of MacLean-Grove & Co., leads the General Contractors Association for 1960.

LIMA

Morris & Reimann Wreckers:

Well pleased with LIMA 44-T

"We've been in the wrecking business 28 years and our 2 year old Lima 44-T is perhaps the best mobile crane we've ever owned!" That's what wreckers Orville Morris and Nelson Reimann, Amherst, N. Y., have to say about their truck-mounted 30-ton Lima crane.

Travels city streets

"It's a fast and powerful rig. We once dismantled a 140-ft. stack in only 45 minutes with a wrecking ball attached to the Lima. It's a good traveler, too. Moves about on city streets from job to job with speed and ease.

"Lima's many special features result in important dollar savings. Maintenance costs and downtime have been very low . . . distributor service excellent.

"We're very well pleased with our truck-mounted Lima."

Undivided responsibility

The 44-T is a versatile 30-ton crane or a 1-yd. shovel. It can also be used with interchangeable dragline or clamshell attachments. The heavy duty 10-wheel carrier (6 x 4 or 6 x 6) is designed and built by Lima . . . giving you the benefit of the undivided responsibility of only one manufacturer. Two engines; choice of power.

Lima Truck-Mounted Cranes are available in capacities up to 75 tons, shovels to 1¼ yd. There's a Lima type and size to add profit on your job. Get all the facts. See your nearby LIMA distributor or write Construction Equipment Division, Baldwin-Lima-Hamilton Corporation, Lima, Ohio.

Workmen in personnel cage suspended from jib of 130-ft. boom rig line around Jamestown, N. Y., church steeple in preparation for demolition. Crane is a Lima 44-T.

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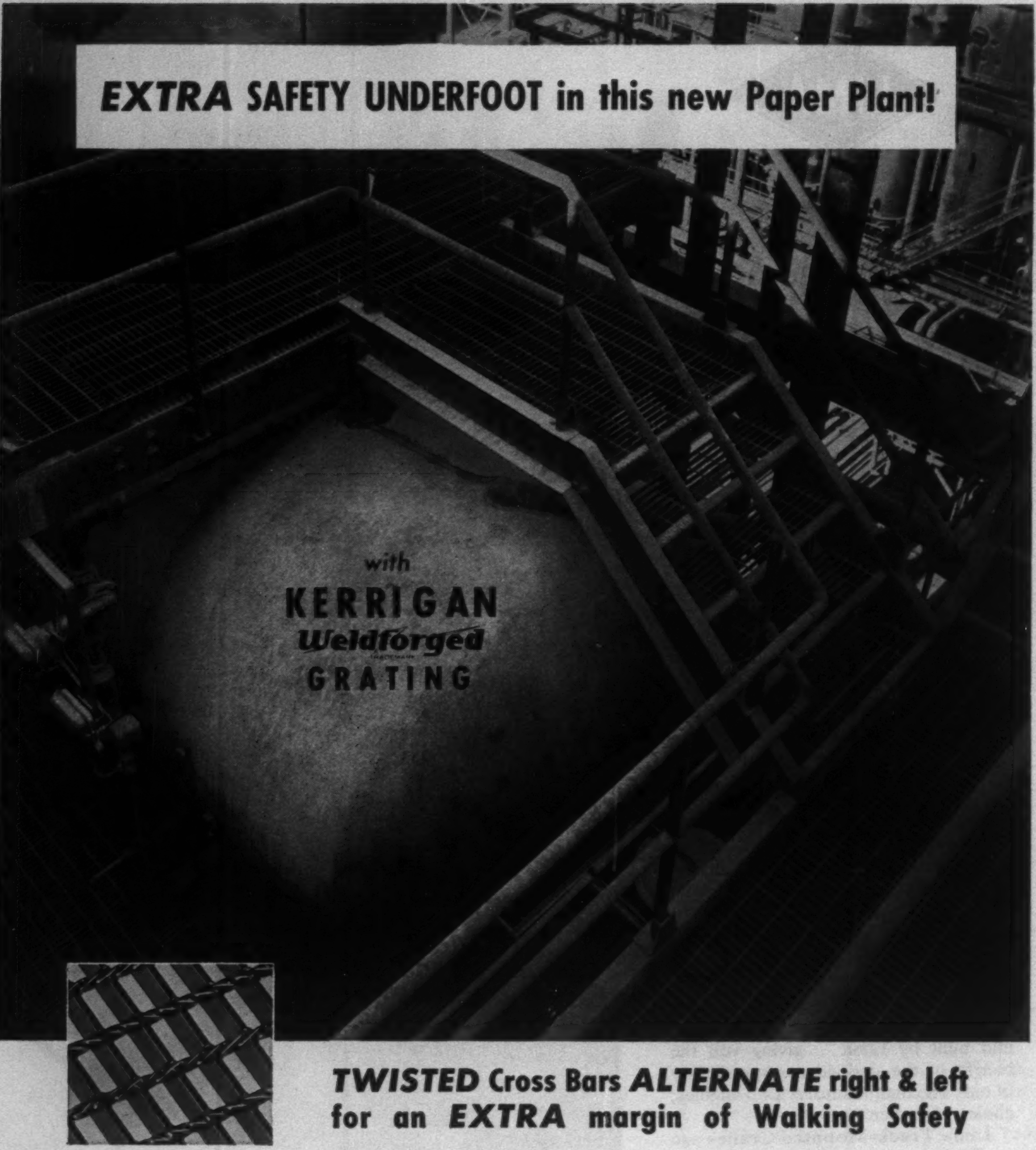

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Obituaries

Robert Carson Dies at 53; Office Building Designer

Robert Carson, New York City architect who designed Rockefeller Center's 33-story Esso Building, died at the age of 53.

Mr. Carson was a partner in Carson & Lundin and was known for his design of outstanding office buildings throughout the country.

In New York City his important structures include buildings of the New York Life Insurance Company, The Associated Hospital Service of New York and the Deering, Milliken & Co., Inc.

He was also the designer of the First National Bank Building of Tulsa, Okla., the Liberty Life Insurance Company Building in Greenville, S. C., the Standard Oil Company of Louisiana Building in Baton Rouge, and the Illuminating Building in Cleveland. He also designed broadcasting and television studios for the American and National Broadcasting Companies.

In 1950, Mr. Carson won the highest awards of the Fifth Avenue Association of New York City for his Esso Building design.

Mr. Carson was a native of Macon, Ill., and graduated from the University of Pennsylvania in 1928. He joined the firm of Harrison & Fouilhoux and later became a designer for the late Raymond M. Hood, one of the original architects of Rockefeller Center. In 1939 he formed a partnership with Earl H. Lundin. In that same year he was named resident architect for Rockefeller Center, Inc., a job he held for eight years. He was also responsible for the design of the Christmas decorations and flower displays at the Center.

Harold P. Norton, 64, architectural civil engineer with Outcalt, Guenther & Associates, of Cleveland.

Clayton W. Paige, 57, city engineer and public works director of Burbank, Calif., since 1941. He was chairman of the Metropolitan Transportation Engineers Board, past director of the League of California Cities, and American Public Works Association.

Jeremiah C. Finch, 79, retired engineer of the New York State Department of Public Works. He served as state secretary of the Highway Department and designed sections of the Thruway.

Frank Newcomer, 75, retired Indianapolis, Inc., civil engineer. He was with the Indiana Public Service Commission for 15 years, the Indianapolis Power & Light Co. for 10 years, and the Indiana Board of Health for five years.

Maurice McNich, 61, superintendent of commercial construction for Sletten Construction Co., Great Falls, Mont. His jobs included erection of the Barber Building in Great Falls, new buildings at Northern Montana College, Havre, and remodeling of the First National Bank in Great Falls.

Jewel A. Benson, 60, president of Benson Tractor Co., Houston, and national president of Associated Equipment Distributors. A leading distributor of construction equipment for many years, he served eight years as director of AED, and three terms as vice president.

Adam B. McClatchy, 57, Narberth, Pa., building contractor and real estate developer.

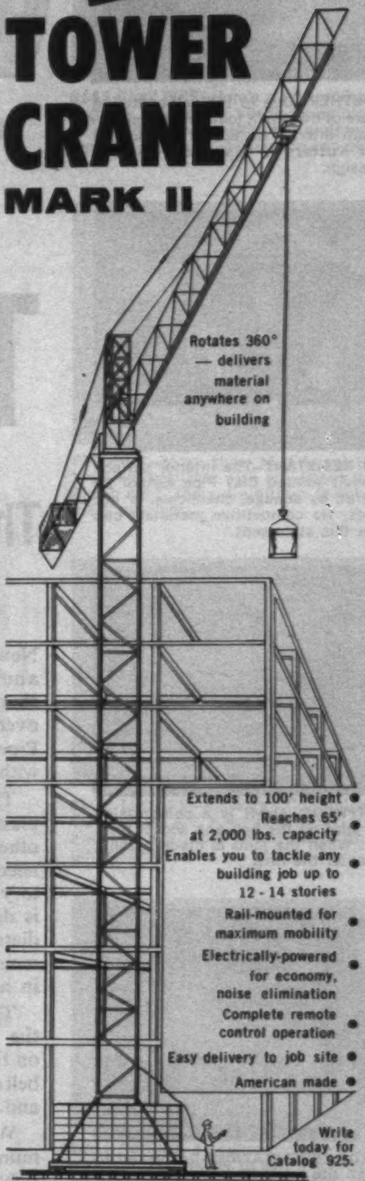
Carl G. Dilks, 57, superintendent of construction engineering, Philadelphia office of the American Laundry Machine Co.

George Reichert, 72, structural engineer. He was associated with the City of Philadelphia and the Link Belt Co.

John E. Scott, 75, retired civil engineer for Louisville & Nashville Railroad.

Hubert E. Sargent, 68, chief engineer of the Vermont Highway Department since 1925. He has been a construction engineer for the New Hampshire State Highway Department from 1919 to 1925. Mr. Sargent was past president of the Association of State Highway Officials of the North Atlantic States, and past president of the Vermont Society of Engineers.

SHLAGROMATIC
New
TOWER CRANE
MARK II


Rotates 360° — delivers material anywhere on building

- Extends to 100′ height
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- Electrically-powered for economy, noise elimination
- Complete remote control operation
- Easy delivery to job site
- American made

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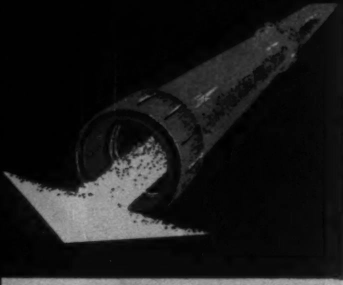
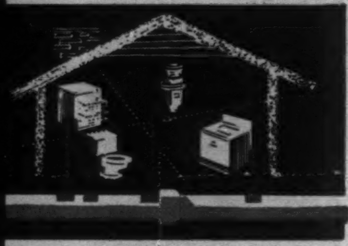
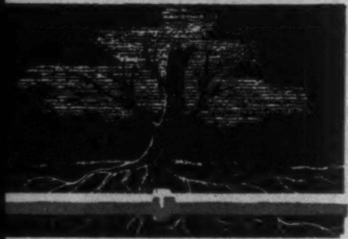


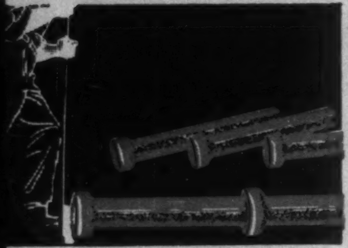
SMOOTHER—Due to the self-centering feature of the Amvit joint and the super-smooth interior surface of the pipe, a lower Kutters "n" value can be used in design.



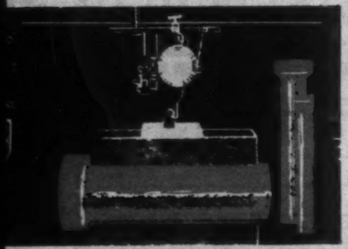
ACID RESISTANT—The interior surface of Amvit Jointed Clay Pipe cannot be harmed by sewage, chemicals, or hot liquids. No competitive materials can make this statement.



ROOTPROOF—Amvit is a compression type joint on the ball and socket principle. When the joint is made nothing can enter the line.



SPEEDS INSTALLATION—Delivered to the job site ready for immediate installation, Amvit is a true mechanical joint. It is pliable, permitting reasonable deflection.



STRONGER—Amvit Jointed Clay Pipe far exceeds A.S.T.M. specifications because it is produced by the most modern manufacturing techniques with rigid quality controls.

Amvit Jointed Clay Pipe proved

NOW, A NEW
TO SERVE THE

The Factory-made Plastic Mechanical Joint for quick, low-cost installation

Never before has a product gained immediate and wide acceptance and usage in such a short period of time. In the past few years over 100,000 miles of Amvit Jointed Clay Pipe have been installed across the country with outstanding results.

The Amvit Joint is manufactured from plasticized resins of polyvinyl chloride. No other combination of materials is used or needed. It is applied on the pipe at the factory by a special manufacturing process and is delivered to the job site ready for immediate installation. No special tools or equipment are needed and the line can be installed in adverse weather.

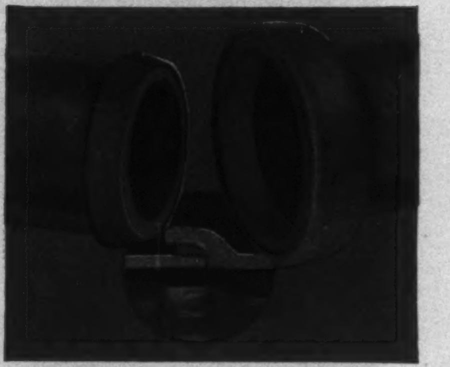
The design of the Amvit Joint is based on the ball and socket principle. The material on the spigot end is a convex shape, with the bell end in a concave shape. This permits easy and rapid installation.

When the joint is made, it reaches maximum compression which results in a really tight line, thus preventing infiltration, exfiltration and root penetration. A large savings in both pumping and treatment plant costs can be achieved.

The design of the Amvit Joint assures self-centering which gives a smoother invert and better flow characteristics. This, in turn, results in a trouble-free line with less maintenance and repair.

Due to the tightness of the joint, no foreign matter such as sand, stones or dirt can enter the line. This permits a larger capacity in the pipe for transmittal of sewage alone. Since infiltration is practically eliminated, the sanitary sewer does not have to carry anything other than that for which it was designed. This feature permits the use of smaller sized pipe in many instances and will reduce the material cost.

For more information on how Amvit can help cut your sewer project costs, write or call American Vitrified Products Company, at our office nearest you.



FOOLPROOF JOINT—Amvit Joint is a true mechanical joint made from plasticized resins of polyvinyl chloride. It is a compression type joint on the ball and socket principle. When the joint is made, the surfaces of both bell and spigot rings are in constant high compression.

See our Amvit Display at the following conventions:

MARCH—*Ohio Society of Professional Engineers*
APRIL—*New Jersey Society of Professional Engineers*
MAY—*Michigan Society of Professional Engineers*
MAY—*Pennsylvania Society of Professional Engineers*
JUNE—*National Society of Professional Engineers*
JUNE—*National Plumbing and Heating Exposition*

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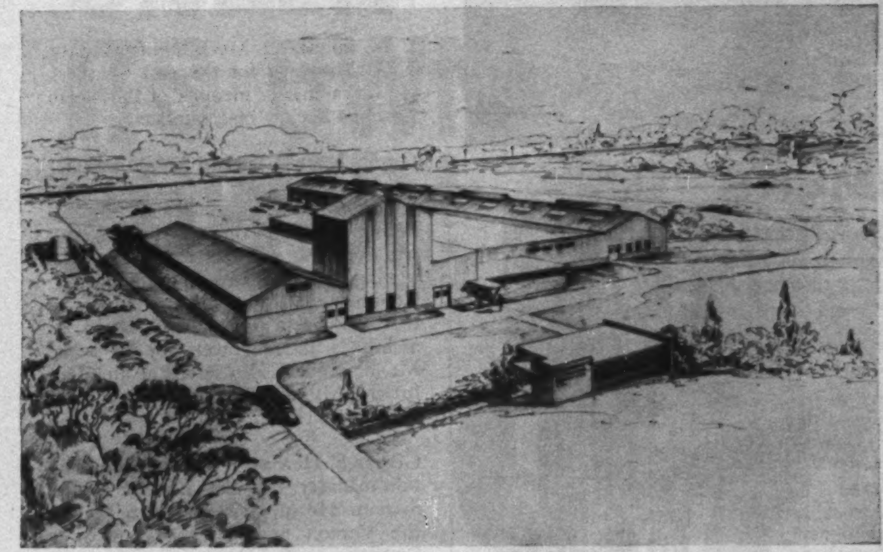
JERSEY PLANT EAST COAST



PRODUCTION STARTS MAY 1st

With a capacity of more than 350,000 feet of clay pipe a month, this new plant will serve the needs of Amvit Jointed Clay Pipe on the East Coast and New England areas. The most advanced production techniques in the industry will produce never-before-equaled quality of clay pipe and factory-made joints.

REGIONAL OFFICES: Cleveland, TO 1-6750 • Chicago, ST 2-5243 • Detroit, GA 1-1940
Los Angeles, EL 9-4535 • Milwaukee, HO 6-4990 • St. Louis, HA 9-5400
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AMERICAN VITRIFIED PRODUCTS COMPANY

NATIONAL CITY BANK BUILDING, Cleveland, Ohio

Since 1848

AMERICAN

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GLAS-GLAZ PIPE—Here's a new product that has everything. Vitrified clay pipe in long five-foot lengths, the rootproof Amvit Joint, glass lined inside and out.

FITTINGS—More than 35 different fittings are available with or without the Amvit Joint. There are fittings to solve every problem.

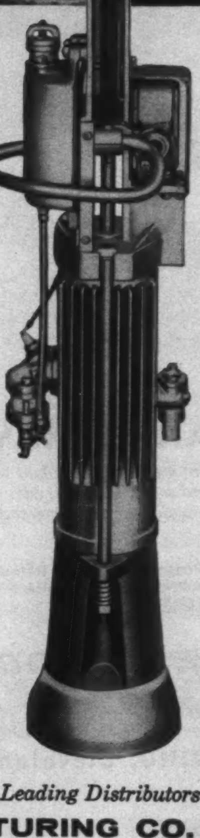
FLUE LININGS—America's flue linings conform to A.S.T.M. specifications and are available in all sizes and dimensions.

WALL COPING—American produces four styles of wall coping to suit any architectural needs. Easily installed, the coping virtually becomes part of the structure.

LINER PLATES—Curved liner plates will protect concrete structures from corrosion. They are used on pipe 36" to 144" diameter. Flat liner plates are used in box culverts, abutments and wherever abrasive action is encountered.

Where SPECIFICATIONS call for . . . . .

HIGH DEGREE SOIL COMPACTION



BARCO RAMMERS are THE ANSWER!

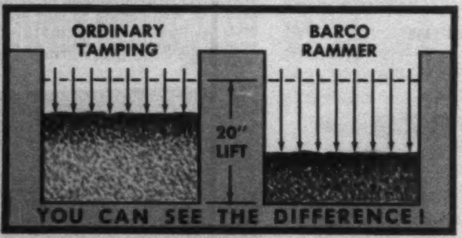
YOU can't get *high degree* SOIL COMPACTION by "patting it" or "shaking it." For deep, penetrating force to produce 95%, 97.5%, or even 100% compaction, Barco Rammers are THE ANSWER. For many soil conditions, they are the only answer.

High degree soil compaction is worth every cent it costs. Barco Rammers are especially effective for compacting fill in restricted areas—close to walls, culverts, abutments, around footings, and in trenches.

ONE MAN OPERATION—On area tamping, one man can average 20 to 30 cubic yards of fill per hour. On 18" trench backfill, using lifts up to 24", the rate is 360 to 600 feet per hour.

ASK FOR A DEMONSTRATION—We will be glad to arrange a demonstration for you; see our nearest distributor or write.

SEND FOR A COPY OF CATALOG 621.



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PRODUCTS BACKED BY EXPERIENCE BARCO FOUNDED 1908

BARCO RAMMER *for High Degree Soil Compaction*
BARCO-VIBRA TAMP *for Granular Fill and Bituminous Surfacing*

Morris Llewellyn Cooke, 87, consulting engineer, Philadelphia. Mr. Cooke was director of public works in Philadelphia from 1911 to 1915 and later was concerned with Pennsylvania's water resources. He came in to national prominence during the Roosevelt and Truman administration when he filled numerous posts, among them director, Water Resources Section, National Resources Board, and administrator of the Rural Electrification Administration.

John R. Thatcher, 58, assistant to the chief of the engineering division, Army Engineer District, Walla Walla, Wash. A 32-year veteran with the Corps of Engineers, he had worked on both Fort Peck and McNary Dams.

George C. Anderson, 53, technical liaison officer for the Army Corps of Engineers, Louisville district.

J. W. Spratt, 60, Mecklenburg County, N. C., surveyor for the past 30 years. He was a charter member of the North Carolina Society of Engineers.

Gerrit J. de Gelleke, 87, Milwaukee practicing architect. He designed many buildings in the Milwaukee area including schools and business structures, and was executive architect for the firm designing the Parklawn housing project. Chairman of the architects division of the Wisconsin registration board of architects and engineers for 28 years, Mr. de Gelleke also served as architect for the Milwaukee School Board from 1905 to 1918.

George S. Hewins, 85, retired construction manager with New England Power System. He supervised construction of the Vernon hydro-electric plant near Brattleboro, the Harriman power station in Whitingham, Vt., the Sherman power plant in Reedsboro, Vt., and many other stations transmitting power to central Massachusetts, Vermont and New Hampshire.

John D. Garcia, Jr., 54, civil engineer associated with Edward C. Hess Engineering Co. A graduate of Drexel Institute of Technology, Mr. Garcia was resident engineer during the construction of the Stroudsburg, Pa., sewage system in 1940.

Garret E. Lyons, 59, director of the Delaware Interstate Highway Division that operates the Delaware Memorial Bridge.

Philip R. Whitney, 81, retired professor of architecture at the University of Pennsylvania.

BRINGS COMPRESSED AIR ANYWHERE UNDER ITS OWN POWER!

Here's a self-propelled air compressor that eliminates *all* the dead time spent by conventional compressors waiting to be towed somewhere! The Tractair is a 42-hp tractor and a 125-cfm air compressor. It brings air power to sites you'd fear to tread with truck-towed compressors. You can park it in a ditch or on a steep slope, attach the hose, and start drilling. When finished, the operator drives it to the next job—without waiting for a tow truck or men to jockey it into position. You can drive up close to the work, too, which means shorter hose . . . less hose damage . . . and full 125 cfm power at the tool.

The improved Tractair offers greater efficiency and fuel economy. It's designed for operator convenience . . . all-weather dependability . . . and the easiest servicing in the field. Add available attachments and you have a money-saving self-propelled air-plant for year-around construction and maintenance work.

Ask your Le Roi distributor for a free demonstration. Or write to Le Roi Division, Westinghouse Air Brake Co., Milwaukee 1, Wis.

LE ROI TRACTAIR® AIR COMPRESSORS

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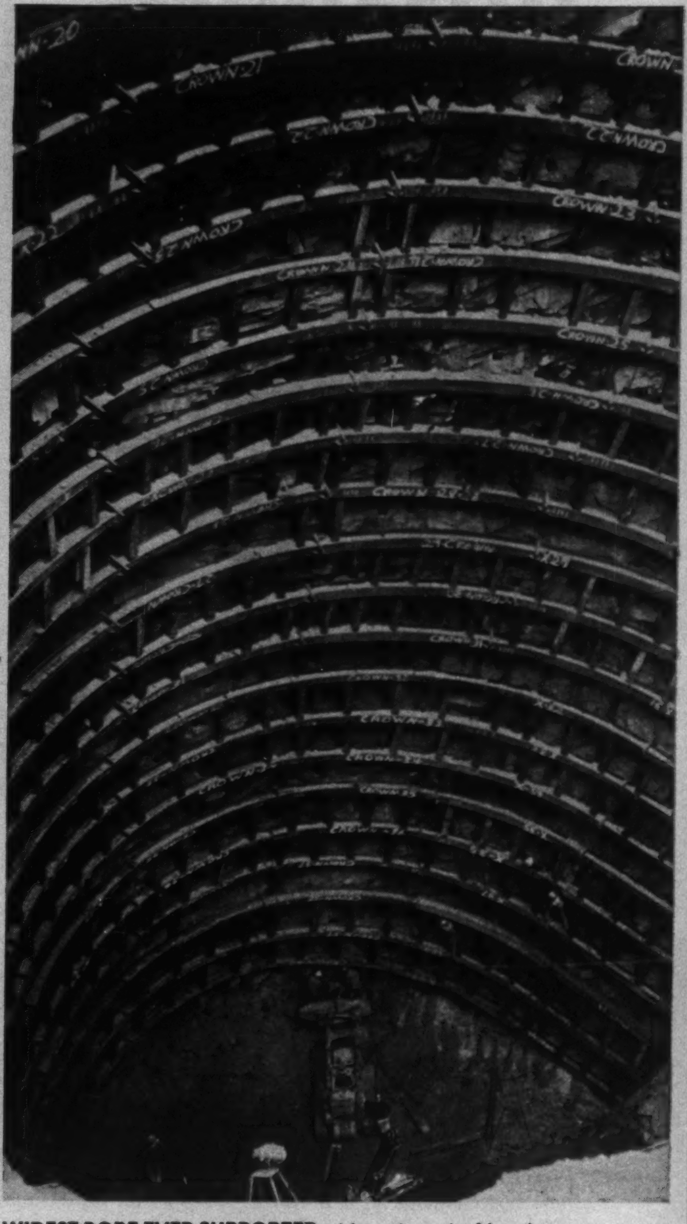
PORTABLE AND TRACTAIR® AIR COMPRESSORS • STATIONARY AIR COMPRESSORS • AIR TOOLS

New Construction Idea News

How COMMERCIAL Ribs Support All Five

U. S. BUREAU OF RECLAMATION PHOTO FROM UPI

COLORADO RIVER DISAPPEARS as flow is diverted through tunnel in west canyon wall where dam will soon start to rise in the 700 ft. gorge of the Colorado River. Glen Canyon Dam is a $325,000,000 Bureau of Reclamation project including a 900,000 kw hydroelectric power plant. It will create an upstream reservoir 186 miles long to infuse vigor and productivity into arid wasteland.



WIDEST BORE EVER SUPPORTED with steel required heaviest tunnel ribs ever bent in quantity. Portals of spillway tunnels are 113 ft. wide, over 80 ft. high at crown. Bore gradually changes to circular 63 ft. diameter. COMMERCIAL engineered and produced all ribs...design involved solving of ever-changing curves...fabrication included multi-curvature bending of 14" WF beams @ 167#/ft. for roof support at transition and 12" WF beams @ 72#/ft. for circular section. Solved was one of the most difficult tunnel support jobs ever undertaken.

Glen Canyon Tunnels

Glen Canyon Dam — Merritt-Chapman & Scott Corp., Prime Contractor
Access Tunnel — Frazier-Davis Construction Co., and Gibson-Roberts Construction Co., Tunnel Contractors
Left Spillway Tunnel—Frazier-Davis Construction Co., Tunnel Contractor
Right Spillway Tunnel — Northwood, Inc., Tunnel Contractor
Left Diversion Tunnel—Frazier-Davis Construction Co., Tunnel Contractor
Right Diversion Tunnel—Mountain States Construction Co., Prime Contractor

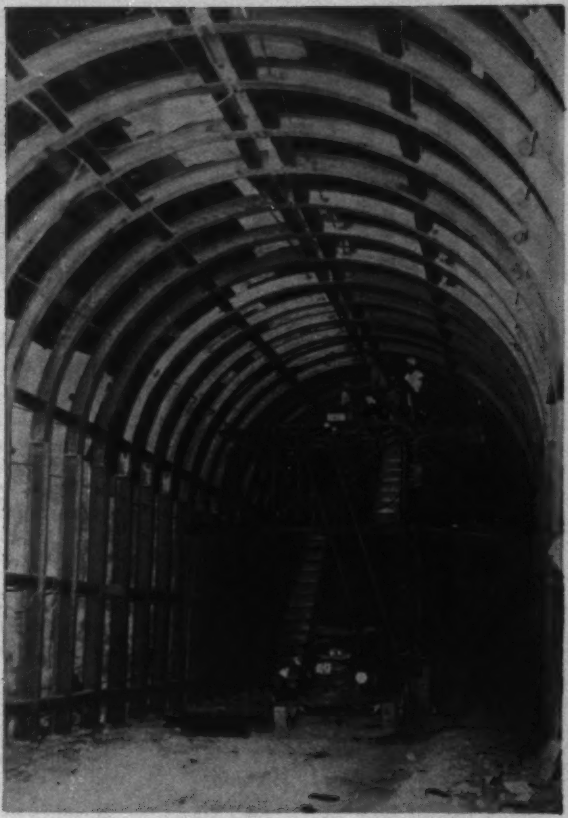
COMMERCIAL steel ribs and posts—unanimous choice of the four tunnel contractors—provide support for access, diversion and spillway tunnels for Glen Canyon Dam project...scheduled completion 1964.

Working with the Bureau of Reclamation, COMMERCIAL designed and fabricated steel sets which proved to be the solution for supporting these rock tunnels. All were of unusual size, length and roof profile and were constructed under difficult working conditions.

In general: Working conditions in all five tunnels demanded that complete support units be accurately fabricated for easy, fast field erection. The two diversion tunnels, two spillway tunnels and the access tunnel totaled close to 17,000 ft. of tunnel. Delivery schedules were timed to tie in with job progress target dates in the tunnel headings.

In particular: COMMERCIAL solved the extremely difficult task of supporting the multi-profiled transition sections of the spillway tunnels. The problem of size was complicated by the changing elevation and shape of the transitions. At the portal the section was the rectangle of the open cut surmounted by the arch of the tunnel roof. This shape varied continuously toward the smaller and circular cross section of the tunnel to which the transition joins. In addition, the elevation of the roof, spring and flow lines was ever-changing throughout this section and each line's elevation was different. COMMERCIAL had to design supports to fit three exponential curves—each a different formula.

Complete details of COMMERCIAL's contribution in supporting the spillway tunnels for this U. S. Bureau of Reclamation project are available to you. If you have a challenge involving support for a shaft, surface or sub-surface tunnel—hard or soft ground—engineering counsel, based on more than 30 years of experience, is yours for the asking. Address: Commercial Shearing & Stamping Company, Dept. E-13, Youngstown 1, Ohio.



11,000 FT.—8% GRADE ROADWAY—all in tunnel in the canyon wall with tunnel windows every 1,000 ft.—leads to base of dam and will provide access to future powerhouse. Bore: over 20 ft. wide, 22½ ft. high arched roof. Supports: 4-piece rib and post sets, 8" WF beams @ 31#/ft. set on 4 ft. centers.

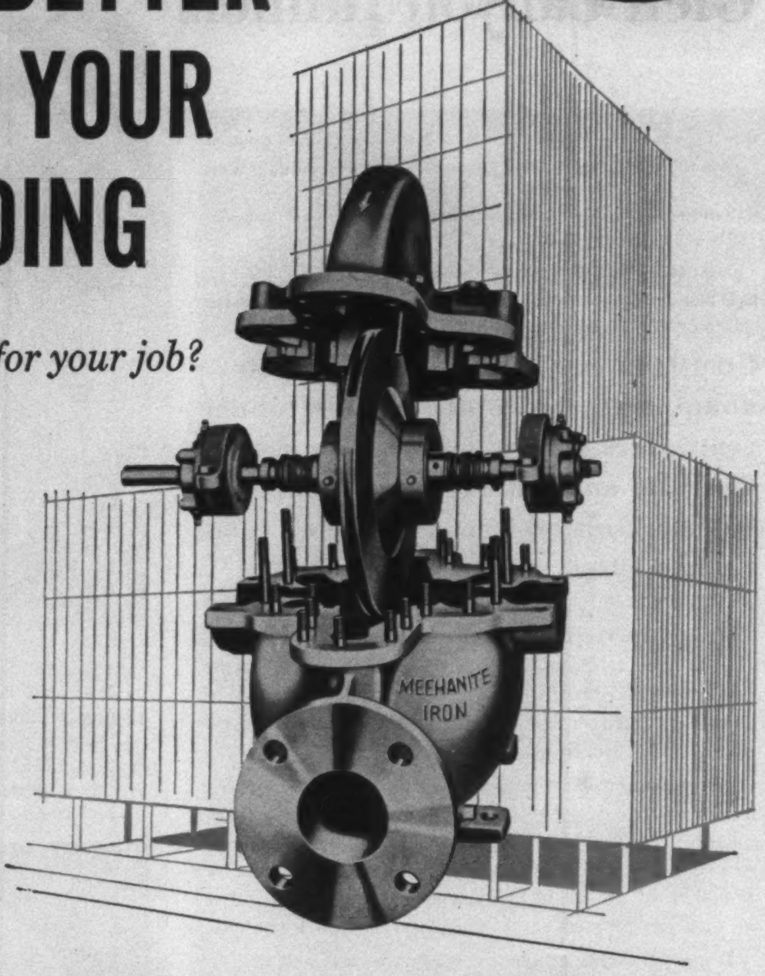
TWO DIVERSION TUNNELS each over half mile long, aided by cofferdams, sidetrack the Colorado to allow dam construction. Downstream sections later will be joined with plunging spillway tunnels to handle flash flood overflow. Arch: 21' 10" above and 43' 2" wide at spring line. Finished concrete lining: 41' diameter. Steel supports: 6-piece sets spaced on 4 ft. centers. Ribs and posts: 10" WF @ 45#/ft. supported on double 8"I @ 18.4#/ft. wall beams.

CIRCLE 223 ON READER SERVICE CARD

PEERLESS PUMPS

GET THAT BETTER PUMP FOR YOUR NEW BUILDING

Why the AquaLine for your job?



Fast, Easy Installation—Peerless AquaLine pumps install quickly in new or existing systems. No special tools are required. Take it out of the package and put it to work.

Compact, Space Saving — Sealed type AquaLines require only one-half the space of other type pumps. Even the packed types are streamline and compact, permitting efficient space-saving layouts.

Easy to Maintain —AquaLine's horizontal split-case design affords quick inspection of rotating parts without disturbing piping. Parts lift out for easy replacement, materially reducing down time.

Immediate Availability—All sizes of pumps and parts are stocked for rapid delivery. You get the pump you want when you need it—ready to unpack and install.

Low in Cost, High in Quality—Peerless AquaLine pumps are engineered with the same high-quality traditionally found only in more expensive units. Yet this pump is priced right. Get the facts. Send for Bulletin B-2100 today.

FOR EFFICIENT DEPENDABLE WATER HANDLING SPECIFY THE NEW PEERLESS *AquaLine* PUMP

AquaLine Characteristics:

Sizes: to 8 inches	**Capacities: to 2600 gpm**
Heads: to 280 feet	**Temperatures: to 250° F**

ATTENTION DEALERS: A few choice dealerships are available for the Peerless AquaLine Pump. Write us for more details.

Putting Ideas to Work

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Peerless Pump

Offices:
New York; Detroit; Cleveland; Chicago; Indianapolis; St. Louis; San Francisco; Atlanta; Plainview; Lubbock; Phoenix; Albuquerque; Los Angeles; Fresno.

Distributors in principal cities.
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Piping, Electrical Man-Hours

Here is a matched pair of books that will belong on the estimator's shelf:

Estimator's Piping Man-Hour Manual—by John S. Page and Jim G. Nation. 146 pages. Gulf Publishing Co., Houston, Tex. $7.50.

Man-hour tables are presented for the fabricating and installing of pipe from 1 to 24 in. OD. They cover an impressive assortment of bends, fittings and types of ferrous and nonferrous pipe.

Both shop and field methods of assembly are covered.

The values presented result from analysis of many hundreds of time-and-methods studies and actual cost records on jobs ranging from $50,000 to $2.5 million.

Tables throughout are based on "average" productivity of 70%. Examples illustrate how to judge the productivity to be expected on the job to be estimated, how to correct for variations from the 70%. The factors: general economy of the area; supervision; labor relations; job conditions; equipment; weather.

The tables are based on composite crew hours. Superintendents and higher are considered as overhead and excluded; general foremen and crew foremen are considered as direct labor costs and included. The manual explains this with examples.

This manual is intended for the less experienced as well as for specialists and top-flight process piping estimators.

Estimator's Electrical Man-Hour Manual—by John S. Page and Jim G. Nation. 219 pages. Gulf Publishing Co., Houston, Tex. $10.

The second of the man-hour manuals follows for electrical estimating the pattern of its predecessor for piping. It tabulates, according to size of unit to be installed, composite crew man-hours for the operations encountered on electrical construction or installation. It defines the crew make up and shows how to arrive at a composite crew, man-hour dollar rate to facilitate pricing.

In the section on Conduit Boxes and Fittings, 42 operations are rated in man-hours: on Service and Feeder Wiring, 8; Branch Circuit items, 8; Lighting Fixtures, 19; Panelboards & Cabinets, 6; Safety Switches, 2; Hangers & Fasteners, 5; Underfloor and Buss Ducts, 13; Starters & Motors, 34; Mounting Transformers, 2; Outside Construction, 15; Underground Duct & Cable, 6; Communication & Signal Systems, 13; Demolition, Excavation & Concrete, 15; Miscellaneous Technical Information, 14 items.

'Highway Engineering' Revised

Highway Engineering. By Leo J. Ritter, Jr. and Radnor J. Paquette. Second Edition. 739 pages. The Ronald Press Co., New York, N. Y. $10.

Covering the entire field of highway engineering, this widely used book has been completely revised and brought up to date in its second edition. The book is valuable as an undergraduate and graduate textbook in the subject, and as a reference for professional engineers.

Arranged in a logical sequence, it proceeds from the general to the particular and examines major factors in the order in which they would be encountered in the orderly development of a highway or highway system. Major divisions of the book are highway administration, finance, planning, design, construction and maintenance.

Every chapter has been revised to bring it in line with current practice and to reflect the impact of the greatly accelerated highway program upon every phase of highway engineering.

Material on highway economics, finance and geometric design has been changed to bring it in line with current AASHO standards and procedures. The Unified Soil Classification System has been added to the chapter on soils; the drainage chapter has been sharply revised to include the latest material on hydraulic design.

Construction chapters incorporate recent advances in methods and equipment. Information on asphalt emulsions has been added to the chapter on bituminous materials. Material on the design of high-type asphaltic paving mixtures has been expanded by addition of the Marshall and Hveem methods. Discussion of concrete pavement design is changed to bring it in line with current thinking on joints and joint spacing, and the use of distributed reinforcing.

Route Location Updated

Route Surveys and Design—Thomas F. Hickerson. 568 pages. McGraw-Hill Book Co., New York, N. Y. $8.50.

This is the fourth edition of a standard textbook and field or office manual first released in 1932. Previous editions were published under the title "Route Location and Surveying."

Emphasized are basic principles and methods of location and design of transportation routes, with emphasis on highways. By "design," the author means primarily design features that influence horizontal and vertical alinement.

The fourth edition reflects many changes associated with increasing use of photogrammetry and electronic computers in route location and design, principally in the highway field. Discussions of transportation systems, reconnaissance, preliminary, and location surveys reflect current methods.

The author's chapters on circular curves, compound and reverse curves, parabolic curves, transition spirals, and spiraled compound curves contain new treatments of certain problems and have been somewhat enlarged to provide basic data needed for office and field use. Material on sight distances and geometric design controls has been expanded in line with current policies of the American Association of State Highway Officials.

Comprehensive treatment of earthwork contained in earlier editions is retained in this one, with some additional material on computer applications. Material on drainage surveys is condensed and inadequate; if the author wanted to cover this subject at all, more weight should have been given to it. Construction surveys and staking are covered briefly.

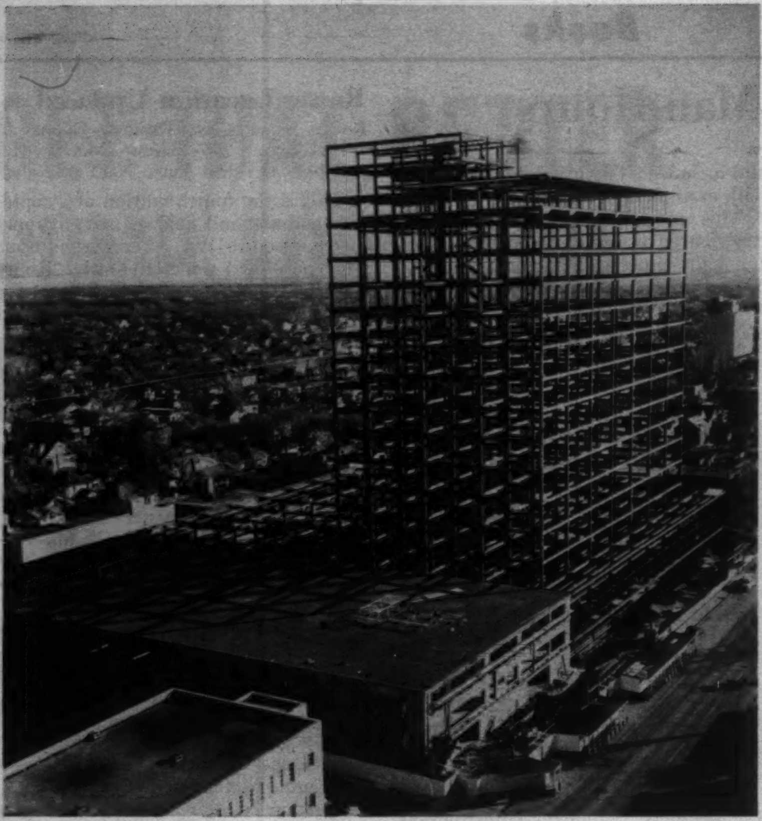
Design Data Expanded

Data Book for Civil Engineers, Vol. I, Design—Third Edition, by Elwyn E. Seelye. 959 pages. John Wiley & Sons, Inc., New York, N. Y.; Chapman & Hall, Ltd., London. $24.

This book, originally published about 15 years ago, has been updated and expanded. Major new items include prestressed concrete, ultimate strength design of concrete, plastic design of design and composite design.

A brief section on aluminum design also has been added. And there are more complete treatments of highway geometrics, highway capacity, airport design, heliports, airport terminal buildings, bridge bearings and expansion joints and waterfront structures.

(*Books continued p. 226*)



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Brief Reviews

• **Reinforcing manual** — Bar setters should understand why the material they handle is placed as it is for maximum efficiency. Starting with this idea and expanding it to include detailing and rudiments of design as well, the Concrete Reinforcing Steel Institute has compiled a reinforcing manual not only for the bar setter and his apprentice, but for the use of detailers and designers and inspectors. 287 pages. $3. Concrete Reinforcing Steel Institute, 38 South Dearborn St., Chicago 3, Ill.

• **Equipment buyers guide**—The 1960 "Green Guide" contains nearly 2,000 separate appraisals on 800 models of construction equipment priced by make, model, series and special attachments. Single copy subscriptions are $24 including master price book and supplementary bulletins. Pacific Appraisal Co., San Carlos, Calif.

• **Sanitary Engineering Manpower**—Survey of factors such as age, education, years of service, type of employer, specific duties, income, society affiliations. U.S. Public Health Service Publication No. 703, Supt. of Documents, U.S. Government Printing Office, Washington 25, D. C. 25 cents.

• **Noise control** — "Noise Control in Buildings" reports the findings of a 1959 conference held by the Building Research Institute. It discusses such subjects as sound transmission through partitions and suspended ceilings, controlling noise from air-conditioning, ventilating and other equipment. Building Research Institute, National Academy of Sciences—National Research Council, 2101 Constitution Ave., Washington 25, D. C. $5.00.

• **Flat roofs**—"Ventilated and Unventilated Flat Compact Roofs" contains results from roof laboratories at the Technical University of Norway and from studies of existing flat compact roofs by the Norwegian Building Research Institute. The 160-page book-Norwegian Building Research Insti-let is by J. Holmgren and T. Isaksen. tute, Oslo-Blindern, Norway.

• **Fire-resistant construction**—"Fire-Resistant Construction in Modern Steel Framed Buildings" summarizes information about fire-resistant materials and construction available to the designer of steel structures. 44 pages. American Institute of Steel Construction, 101 Park Avenue, New York.

(Books continued p. 231)

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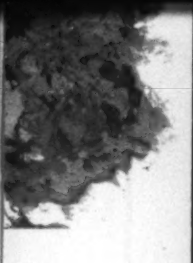

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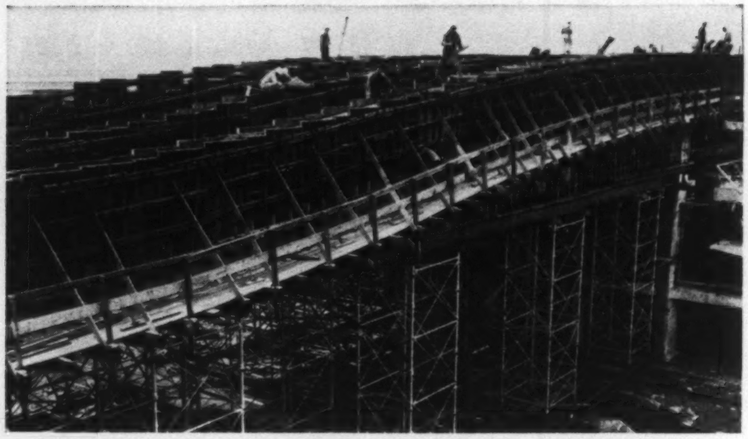
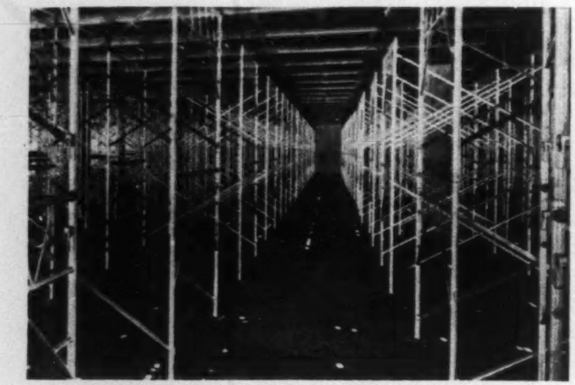
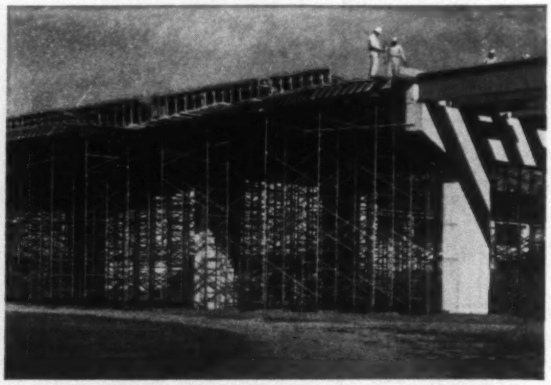


EXTRA HEAVY DUTY SHORING Rolls to Pours—Mounted on a traveller, each Extra Heavy Duty Shoring set-up supports two of 16 clear-span concrete girders from 7′8″ to 8′8″ deep, 2′ to 2′10″ wide, and 125′ long, at Eastern Airlines Terminal Bldg., Idlewild Airport, N.Y. Gilbane Building Co., gen. contr., pours a pair of girders, lowers shoring and rolls it to new positions.



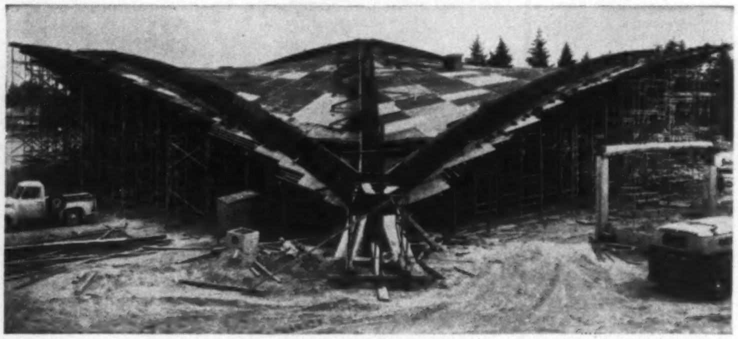
STANDARD SHORING Meets Most Job Needs— Standard "Trouble Saver" Shoring 5′-wide frames are assembled rapidly to provide safe, ample support for pan construction of the Atomics International Project, Canoga Park, Calif. Shoring supports 30″ x 30″ x 14″ domes with 4½″ slab. C. L. Peck Construction and Realty Co., general contractor.



NEW HEAVY DUTY SHORING Supports Bridge— Safe support for the heavy loads imposed by this concrete overpass in San Jose, Calif., is provided by new PS Co. 4′-wide Heavy Duty Shoring frames, tested under simulated field conditions to safely support loads up to 10,000 lbs. on each leg. General contractor, Oscar C. Holmes.

STANDARD FRAMES SHORE HYPERBOLIC PARABOLOID STRUCTURE—

On the new auditorium for Edward S. Ingraham H. S., Seattle, Sound Construction Co., general contractor, uses 1300 standard "Trouble Saver" Shoring frames to support dome and slab formwork for this concrete hyperbolic paraboloid structure. Design involves three anchors, set 161′ apart, from which three center beams, 2′6″ x 4″, arch to 35′ high. Two perimeter beams per anchor fan out and intersect at 28′ high.



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ALUMINUM CONSTRUCTION MANUAL—389 pages. The Aluminum Association, 420 Lexington Ave., New York 17, N. Y. $3.00.

OFFICES IN THE SKY—by Earle Shultz and Walter Simmons. 328 pages. Bobbs-Merrill Co., Inc., 1720 E. 38th St., Indianapolis 6, Ind. $6.00.

INDUSTRIAL THERMAL INSULATION—by A. C. Wilson. 312 pages. McGraw-Hill Publishing Co., 330 West 42nd St., New York 36, N. Y. $9.00.

GEOLOGY FOR ENGINEERS—by Joseph M. Trefethen. Second edition. 632 pages. D. Van Nostrand Co., Inc., 120 Alexander St., Princeton, N. J. $8.50.

ENGINEERING MECHANICS—by Dwight F. Gunder and Derald A. Stuart. 391 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $7.75.

ENGINEERING THERMODYNAMICS—by D. B. Spalding and E. H. Cole. 375 pages. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. $8.50.

PRINCIPLES OF PAVEMENT DESIGN—by E. J. Yoder, 569 pages. John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. $13.25.

THE BOY ENGINEER—by Edward L. Throm. 248 pages. Golden Press, Inc., 630 Fifth Ave., New York 20, N. Y. $3.95.

THE MOON CAR—by Hermann Oberth. 98 pages. Harper & Brothers, 49 East 33rd St., New York 16, N. Y. $2.95.

FOUNDATION DESIGN AND PRACTICE—by J. H. Thornley. 298 pages. Columbia University Press, 2960 Broadway, New York 27, N. Y. $15.00.

URBAN PROBLEMS AND TECHNIQUES—249 pages. Chandler-Davis Publishing Co., P.O. Box 36, West Trenton, N. J. $3.65 (soft bound); $4.50 (hard cover).

COMPILATION OF ASTM STANDARDS RELATING TO COATED AND UNCOATED IRON AND STEEL SHEET AND STRIP—148 pages. American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pa. $3.00.

SNOW HYDROLOGY—PB 151660. 621 pages. Office of Technical Services, Dept. of Commerce, Washington 25, D. C. $8.00.

PROGRAMMING THE IBM 650 MAGNETIC DRUM COMPUTER AND DATA-PROCESSING MACHINE—by Richard V. Andree. Henry Holt & Co., 383 Madison Ave., New York 17, N. Y. $2.95 (soft cover).

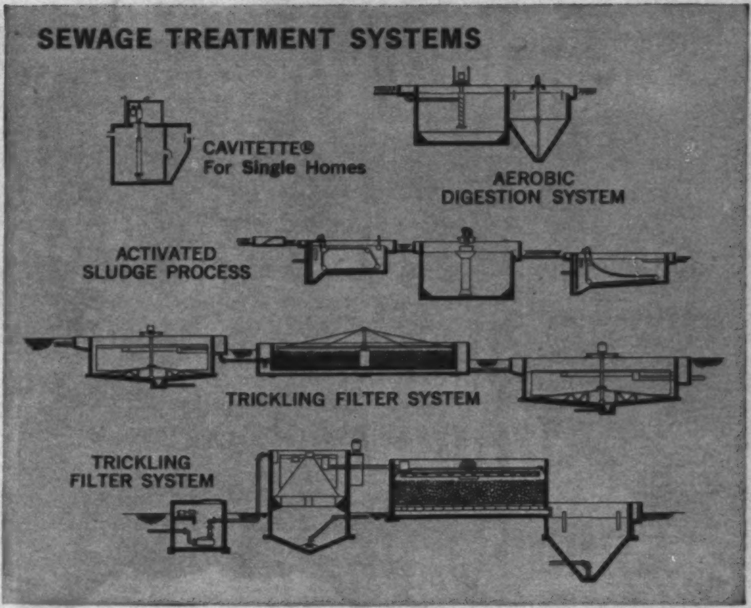
HANDBOOK OF HEAVY CONSTRUCTION—Frank W. Stubbs, Jr., Editor-in-Chief. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $18.50.

RIVER STUDIES AND RECOMMENDATIONS ON IMPROVEMENTS OF NIGER AND BENUE—North-Holland Publishing Co. P.O. Box 103, Amsterdam-Netherlands. $19.80.

INTRODUCTION TO THEORETICAL METEOROLOGY—by Seymour L. Hess. 362 pages. Henry Holt & Co., 383 Madison Ave., New York 17, N. Y. $8.50.

ENGINEERING ECONOMICS FOR PROFESSIONAL ENGINEERS' EXAMINATIONS—by Max Kurtz. 261 pages. McGraw-Hill Book Co., Inc., 330 West 42nd St., New York 36, N. Y. $6.50.

(Books continued p. 232)



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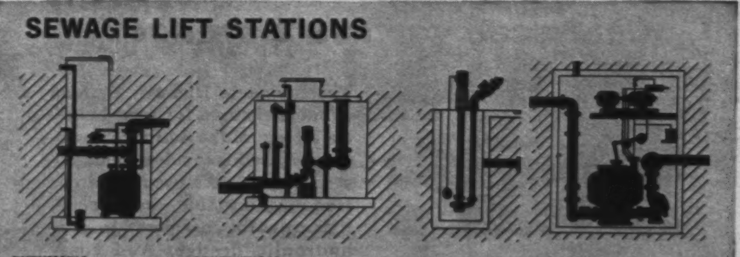

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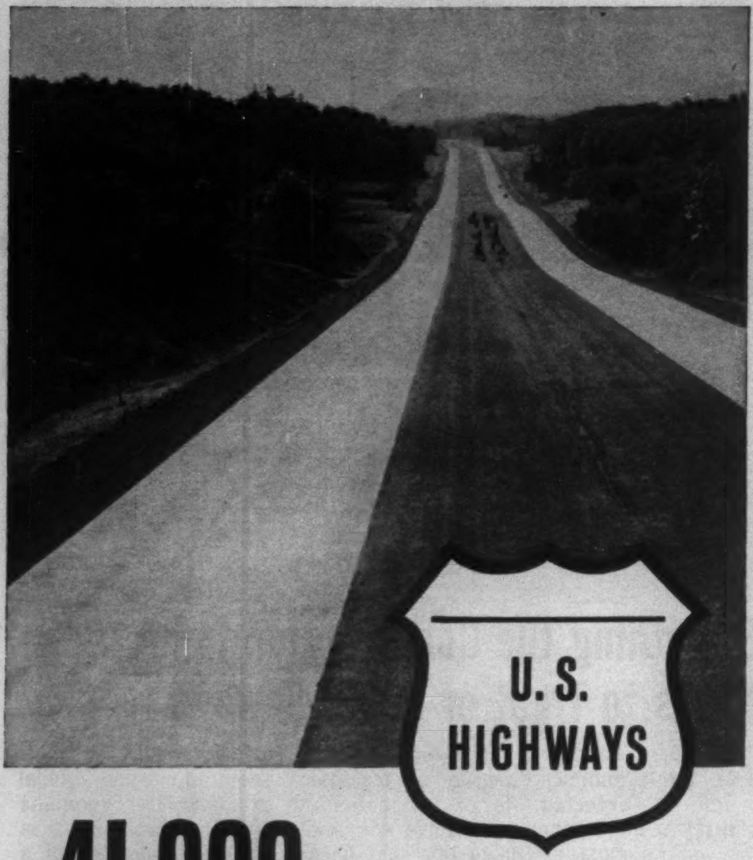

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NUCLEAR TECHNOLOGY FOR ENGINEERS—by R. Hobart Ellis, Jr., 284 pages. McGraw-Hill Book Company, 330 West 42nd St., New York 36, N. Y. $9.50.

THE HIGHWAY AND THE LANDSCAPE—230 pages. Rutgers University Press 30 College Ave., New Brunswick, N. J. $5.00.

PROCEEDINGS OF THE MIDWESTERN CONFERENCE ON FLUID AND SOLID MECHANICS—Two columns. Volume I on Fluid Mechanics; Volume II on Solid Mechanics. Engineering Institute, Division of Extension, University of Texas, 18th & Red River Sts., Austin, Tex. $12.50 per volume; $25.00 for set of two.

HIGHWAYS OVER BROAD WATERS: Life and Times of David B. Steinman, Bridgebuilder—by William Ratigan. 359 pages. Wm. B. Eerdmans Publishing Co., Grand Rapids, Mich. $6.00.

KINEMATICS—by Virgil Moring Faires. 468 pages. McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. $8.50.

HIGHWAY PAVEMENT DESIGN IN FROST AREAS, A SYMPOSIUM: PART I.. BASIC CONSIDERATIONS—Bulletin 225. Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. $2.60.

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DURABILITY OF RESIN-TREATED PAPER HONEYCOMB CORE—Report No. 2158. Director, Forest Products Laboratory, Madison 5, Wis.

LIME AND LIME-FLYASH AS SOIL STABILIZERS—Bulletin 231. Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. $1.60.

STATE HIGHWAY ADMINISTRATIVE ORGANIZATIONS—Special Report 51. Highway Research Board, 2101 Constitution Ave., Washington 25, D. C. 80¢.

THE INDUSTRIAL CHALLENGE OF NUCLEAR ENERGY: STRESA CONFERENCE, PART I—275 pages. Organization for European Economic Co-operation, 346 Connecticut Ave., N.W., Washington 6, D. C. $3.00.

(Books continued p. 236)

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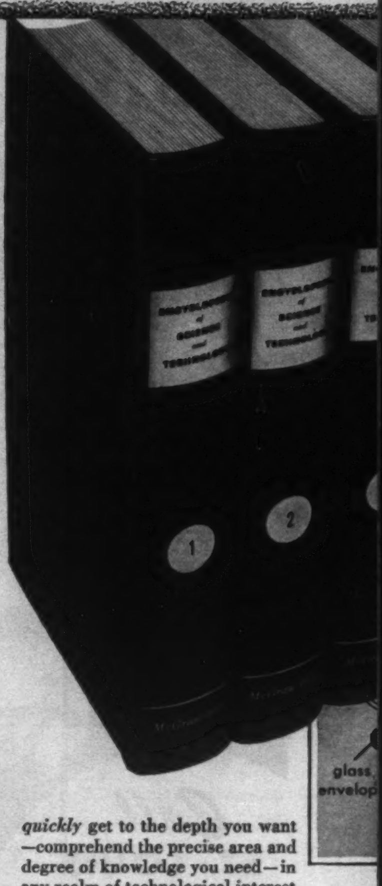

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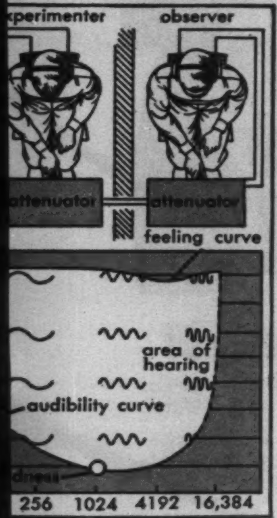

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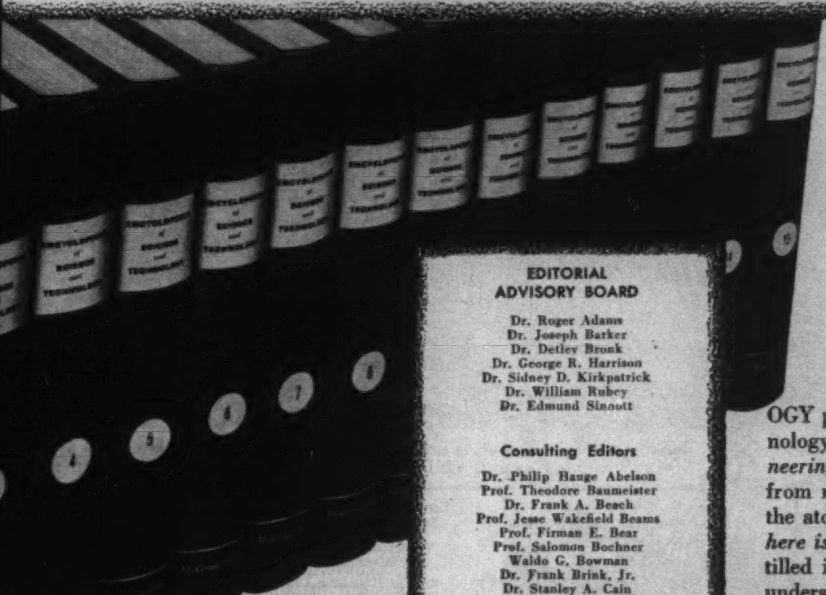

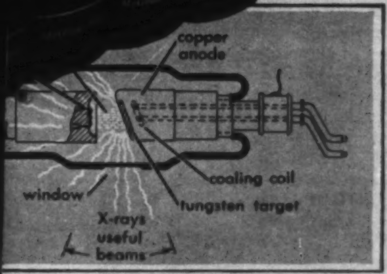

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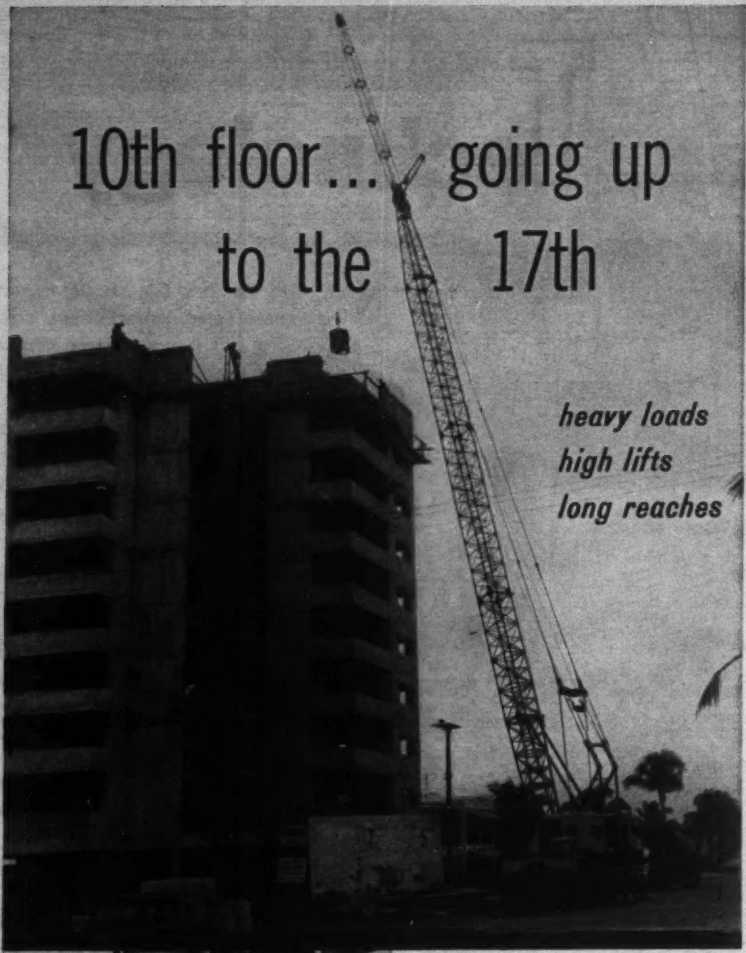

● Building a new apartment in Fort Lauderdale, Fla., the Harrison Crane Service of Miami pours concrete and lifts materials with this Waukesha Engine powered P & H crane. Here at the 10th floor, crane has a 170-ft. boom. From here, up to the 17th floor top, boom will be 200 ft.

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Waukeshas are standard for crane operation. This P & H crane is powered by Model 140-GK—4½ in. x 5½ in. bore and stroke; 525 cu. in. displ. Model 140 Series gasoline engines available up to 225 hp. Other models for crane or shovel installation, up to 1200 hp., Diesel or gasoline.

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ALPHA

BETTER CONSTRUCTION THROUGH
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news and notes from the field

How to Avoid Crazing in Concrete Surfaces

CRAZING or map-cracking of a concrete surface. Excessive shrinking occurred before sufficient strength had developed to resist the shrinkage forces.

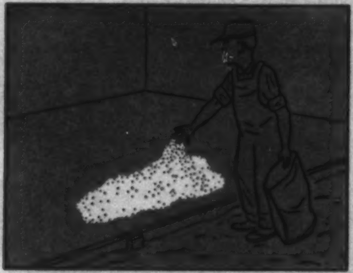
Crazing cracks which appear on the wearing course of concrete are superficial cracks that rarely penetrate deeply. They are caused by surface shrinkage resulting from improper finishing practices and/or inadequate curing.

PLASTIC SHRINKAGE CRACKS are often confused with crazing. Condition shown above occurs soon after or during finishing and results from early loss of mix water to dry subgrade, dry aggregates or to the air. They are much deeper and more widely distributed than crazing cracks.

Effect of Slump

The higher the slump, the greater the danger of over-troweling and bringing excessive fines to the surface of the concrete. High-slump concrete is also severely affected by improper curing. In general, it increases the probability of surface problems including crazing.

Dusting on Sand or Cement



The practice of dusting on dry cement to hasten drying and make finishing easier should *not* be followed. This produces a rich cement mortar wearing surface which will craze and very likely scale.

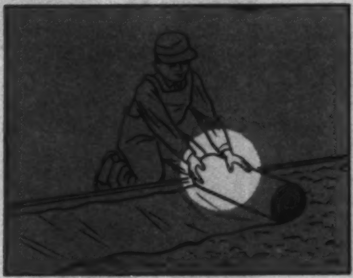
To confirm this, Alpha laboratory technicians made two slabs of the same concrete mix. The first sample was finished according to recommended and accepted practices and produced a smooth, hard, crack-free surface. In the second sample, dry cement was dusted on the surface, and it was not properly cured. This slab was not over-troweled. The results on this sample showed a perfect example of surface crazing.

Inadequate Curing

Inadequate curing causes the surface to dry faster and therefore to shrink faster than the bulk of the concrete. This produces a difference in movement at a time when the concrete wearing surface has attained little strength, resulting in hairline pattern cracks.

Proper Curing Practice

Proper treatment of the concrete after it has been finish troweled is most important in obtaining a smooth, hard, durable wearing surface.



1. Concrete must be kept moist so that cement hardens while continuing to combine chemically with the water.
2. Start curing process after finish troweling as soon as the surface is hard enough to resist damage.

3. Don't allow concrete to air-cure.

More Information

Send for the Alpha Craftsmanship in Concrete Folder #1 which presents much more data on "Steel Trowel Finishing". Reprints of this advertisement are also available on request.

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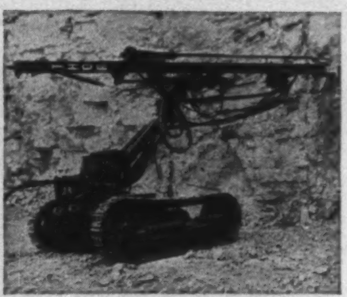
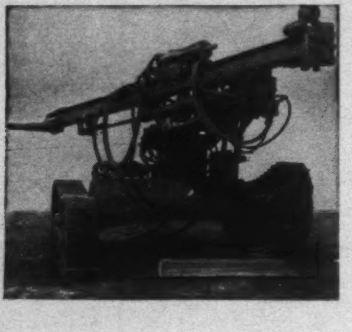
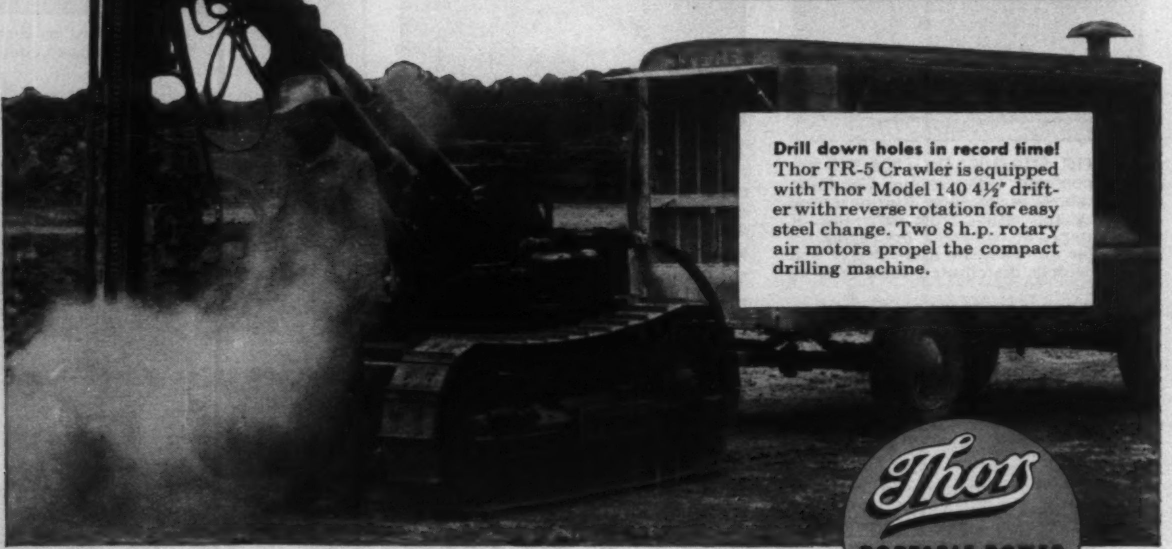




Left: Unique construction of the Thor Model TR-5 Crawler allows mast and boom to remain level on rough, uneven terrain. Boom and mast can be raised or lowered, mast can be swung from side to side, all hydraulically.

Above: One-man operation is easy with Thor's Model TR-5 Crawler. Complete flexibility of all-hydraulic controls raises boom and mast into position for drilling quickly. Rig locks into place and powerful Thor drifter goes into action.

Right: Toe hole drilling is easy with the TR-5. The boom and mast can be lowered flat to the ground for toe or lifter holes. Automatic dump and cone control are operated hydraulically.



Drill down holes in record time!
Thor TR-5 Crawler is equipped with Thor Model 140 4½" drifter with reverse rotation for easy steel change. Two 8 h.p. rotary air motors propel the compact drilling machine.

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Architect's Decision Is Binding

Owner held to have forfeited right to contest decisions of architect through his failure to seek arbitration

Where a building contract provides that decisions of the architect are subject to arbitration and the complaining party fails to seek arbitration, the architect's decisions are final and binding in the absence of fraud or bad faith.

The rule was applied in Connecticut in a dispute between the owner and contractor over payment for work done under a residential construction contract.

Facts were these:

Contractor brought an action to foreclose a mechanic's lien on the property of the owner for services rendered and materials furnished in the construction of an addition to the residence of the owner.

The owner counterclaimed for damages for breach of contract.

The contract provided: The architect is the interpreter of the conditions of the contract. He shall make decisions on all claims of the owner or contractor on all other matters relating to the execution and progress of the work or the interpretation of the contract documents.

All architect's decisions are subject to arbitration. All disputes, claims, or questions subject to arbitration under the contract shall be submitted to arbitration in accordance with the provisions of the standard form of arbitration procedure of the American Institute of Architects. The decision of the arbitrators shall be a condition precedent to any right of legal action that either party might have against the other.

During the course of the work the owner made various complaints to the architect about the way the work was being done. In all cases the architect decided that the work was being done in accordance with the plans and specifications. The work was to be paid for in certain installments. The architect issued certificates for such amounts as he decided were properly due the contractor. The owner then ordered the contractor off the job and the contractor filed a mechanic's lien covering the work performed under the contract and later brought an action to foreclose the lien.

The owner failed to seek arbitration of the architect's decisions and refused to request a stay of proceedings as suggested by the court during the trial, to permit arbitration. The court granted judgment to the contractor holding that the architect's decision was final and binding.

The court stated: "In the absence of fraud or bad faith in the issuance of the certificates, the contractors were entitled to payment of the sums certified by the architects to be due and payable for work performed by the contractors. The complaints of the owners were made, in the first instance, about the decisions of the architects in their interpretation of the plans and specifications and their approval of the work that had been performed by the contracttors.

"Under the contract, these decisions were required to be made by the architects and it was specifically provided that in the event of a dispute all such decisions were to be the subject of arbitration.

"By failing to take the steps toward arbitration set forth in the contract and refusing to avail themselves of the opportunity afforded them by the trial court to have the dispute arbitrated, the owners waived their right to challenge the decisions rendered by the architects with respect to the interpretation of the plans and specifications and the performance of the work under the contract. Batter Building Materials Co. v. Kirschner, 142 Conn. 1, 11, 110 A. 2d 464.

"The decisions of the architects were final and binding upon the parties under the contract, unless they resulted from fraud or bad faith. George S. Chatfield Co. v. O'Neill, 89 Conn. 172, 173, 93 A. 133.

"The court specially found that these decisions were made in good faith and were not the result of fraud or collusion with the contractors. It was not within the authority of the court to substitute its decision for that of the architects. Dahl v. Edwin Moss & Son, Inc., 136 Conn. 147, 153, 69 A. 2d 562. The court correctly concluded that under the circumstances the certificates issued by the architects entitled the contractors to payment of the sums certified by the architects to be properly due."[1]

(1) Friend v. Green, 151 A. 2d 343, Supreme Court of Errors of Connecticut, April 28, 1959.

Contract May Limit Size Of the Engineering Fees

The top ceiling price for engineering services as established by contract will prevail unless the engineers can prove a waiver of the ceiling.

A federal court has refused to rule that a waiver occured under the following circumstances:

The contract for engineering services provided that $500,000 was the maximum fee to be paid unless the parties agreed in writing, and in advance, for increased compensation.

The engineers brought an action to recover additional compensation claiming that the owner had waived the right to a written agreement for such additional compensation.

The court[1] denied the engineers a recovery, sustaining the owner's contention that the changes in the work for which additional compensation was sought were made without consultation with the owner and therefore there was no waiver of the contract requirement for a written agreement to pay more.

The court stated: "The law is clear that where the parties agree that an engineer's fee shall have a ceiling, and no additional compensation for extras shall be payable except by written agreement in advance, such agreement controls. It is also the law, however, that the parties may waive compliance with the requirement that there be a written agreement on extras and ceiling fee.

(1) Alden v. Central Power Electric Cooperative, 168 F. Supp. 19, U.S. District Court of N. D., Sept. 2, 1958.

To Prevent Performance Is a Breach of Contract

When a contractor is prevented from performing his contract, he is entitled to recover the loss of profits that he would have earned had he been permitted to complete the whole contract.

These damages are to be measured as of the time of the breach and any profits he might have earned on other jobs does not lessen the amount of damages he is entitled to recover. However, in cases where the contract is for personal services, in some cases it has been held that the injured party should do what is necessary to mitigate the damages.

The fact that mitigation of damages is not required in construction contracts is well indicated in a case[1] where the contract was to install fire-extinguishing apparatus in a building. The contract required the making of monthly payments as the work progressed. After some of the work had been done, the owner ran into financial difficulties and stopped making the monthly payments, whereupon the contractor stopped work and filed a mechanic's lien for the amount due him for the work performed.

The owner then went into bankruptcy. The lien was foreclosed and the property sold and the contractor was paid for the work he had performed. He then filed a claim against the receiver in bankruptcy for damages for breach of contract and claimed the profits he would have earned had he been permitted to complete the job.

The party who had purchased the property had employed the same contractor to complete the job. In view of the fact that the contractor earned the profit for the uncompleted work from the new owner, the trial court only allowed him nominal damages of six cents.

This judgment was reversed by the appellate court which held that the contractor was entitled to recover damages for breach of contract from the original owner. "On the breach of such contract the claim of the plaintiff (contractor) accrues at once and the law does not inquire into later events."

(1) Grinnel Co. v. Voorhees et al., 1 F. 2d 693.

Extra Cost of Substitute Recovered by Contractor

Where the specifications provide for use of a certain type of material and the contractor is forced by the owner to use a more expensive material, the contractor is entitled to the increased cost of the more expensive material.

The principle was applied in the following case:

Ring Construction Corp. entered into a contract with the United States for the construction of a veteran's hospital at Albany, New York, for a lump sum price.

The specifications provided that the contractor could at its option use gypsum tile or structural clay tile. The contractor, in preparing its bid, decided to use the gypsum tile which was cheaper than the structural clay tile.

When the contractor performed the work, the Government insisted that it use the structural clay tile which was more expensive than the gypsum tile that it intended to use. The contractor demanded that it be paid this extra cost and, upon refusal of the Government to do so, brought an action to recover such increased cost. He obtained a recovery.[1]

(1) Ring Construction Corp. v. United States, United States Court of Claims, June 4, 1958.

Contractor Must Protect Public

Highway job imposes an obligation to the public that cannot be dodged by delegation to a subcontractor

A contractor engaged in highway work owes the public an obligation to keep the highway in a safe condition. He is liable for injuries to a pedestrian even where the injury results from the negligence of a subcontractor.

That was the ruling of a Connecticut court under the following circumstances:

The owner of a factory building entered into a contract with a contractor to perform certain work on a public highway that abutted the factory. The work involved the removal of old tracks and the installation of new ones. The contractor was also required to replace the roadbed and install a concrete base to within one and one-half inches of the top of the rails. The contractor was to keep the concrete base clean until it was resurfaced with an asphalt coating.

The contractor employed a subcontractor to do the asphalt repaving. Before the asphalt coating was applied, the rails of the track protruded one and one-half inches above the concrete base. No facilities were provided for the public to cross the excavated areas.

A pedestrian was injured when he caught his foot on a rail while crossing the highway. This incident occurred before the subcontractor was to start laying the asphalt repaving.

The injured party brought an action against the contractor to recover damages for the injury sustained and obtained a recovery. The judgment was affirmed on appeal.[1]

The trial court found as a fact that the contractor was negligent in leaving the street in a dangerous condition without proper safeguards and as the contract was for the entire work, the subcontracting of the asphalt paving did not relieve the prime contractor from liability.

The appellate court stated: "The principal contention of the defendant (contractor) is that it was an independent contractor and may not be held liable for negligence, if there was any, in the performance of its work here because, under the principle set forth in Boggoratt v. Pratt & Whitney Aircraft Co., 114 Conn. 251, 142, 157 A. 860, and Mann v. Leake & Nelson Co., 132 Conn. 251, 254, 43 A. 2d 461, the work had been fully completed, and had been accepted by the firm for which the defendant had contracted to do it, before the plaintiff sustained the injuries.

"The difficulty with this claim is that the court has found that the defendant had not completed the work. The defendant had committed to a subcontractor the portion of the job involving the application of the asphalt surfacing, but the defendant's obligations flowing from its contract did not terminate by reason of its completion of the aspect of the work which it chose to perform itself.

"The defendant (contractor) owed an obligation to the public and could not relieve itself of liability by delegating to another the performance of a portion of the work. Lambert v. City of New Haven, 129 Conn. 647, 651, 30 A. 2d 923; Hurlburt v. Sherman, 116 Conn. 102, 106, 163 A. 603; Reardon v. Shimelman, 102 Conn. 383, 386, 128 A. 705, 39 A.L.R. 287. Particularly is this true here, where the work necessarily required precautions for the safety of members of the public lawfully using the highway. Compus v. Mc Elligott, 122 Conn. 14, 18, L87 A. 29."

(1) Kisziw v. William P. Bray Company, 141 A. 2d 244, Supreme Court of Errors, Connecticut.

Orders for Extra Work May Be Approved Orally

A contractual requirement that orders for extra work be in writing may be waived by the conduct of a contractor.

Such a waiver occurred in an Illinois situation under the following circumstances:

Prime contract for construction of mess halls and readiness building at an air force base required the contractor to furnish certain equipment and also to install another list of equipment furnished by the government. For convenience, the two lists were called "contractor furnished equipment" and "government furnished equipment."

That part of the work relating to "contractor furnished equipment" was subcontracted. Later, the subcontractor orally agreed to install the "government furnished equipment" also. The change was acknowledged in writing by the prime contractor's officer in charge of the job.

The prime contractor refused to pay the sub for installation of the govern-

(*Legal continued p. 244*)

MARION MOUNTAIN MOVER

A Marion 111-M is lowering mountains in 4-yd. bites these days in West Virginia. Hard at work on a section of interstate super highway, this Marion is slicing some 200 feet of rock and dirt to be used as fill on the road site at the base of the mountain.

Over the years Marion has incorporated job-tested design features into this big diesel unit that have increased the machine's operating efficiency significantly. It's the big reason why the 111-M can move more material faster and keep operating cost to a minimum.

Marion makes a wide range of machines to cover all possible contractor problems...bridge building...highway construction...pipe lines...you name it—and Marion machines can probably do it. Your nearest Marion distributor can give you full details on the exciting Marion line for the 60's, including the profit-producing design changes on the 111-M that make it THE machine in its class.

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Power shovels, hoes, draglines, clamshells, cranes - - crawler, rubber and walker mounted - - ¾ to 100 cubic yards

Pittsburgh Fab-Form, available in lengths up to 28 feet, 3 inches with ⅝-inch corrugation, is handled easily on steel joists by one man at St. Regis Church and School in Trafford, Pa. Contractor H. Justin Brown & Son, Mt. Lebanon, Pa., reported it took four men just one day to lay 10,800 square feet of Fab-Form. Fab-Form was sold and engineered by W. N. Dambach, Inc., Pittsburgh, Pa. Architect: Ermes Brunettini, A.I.A., Verona, Pa.

New Fab-Form by Pittsburgh Steel Cuts Floor and Roof Slab Costs, Gives Greater Length and Width

Fab-Form, a brand new addition to Pittsburgh Steel Products' line of quality construction products, builds in savings of materials and erection time for concrete floor and roof slabs.

New Fab-Form—longest and widest corrugated, permanent steel form for slabs poured over joists—reduces the number of end and side laps through its 32-inch cover width and extra length.

In addition, Fab-Form has an exclusive new welding method that is literally a snap.

Fab-Form is fabricated:

- In standard lengths, plus other lengths up to 28 feet, 3 inches—twice as long as most others.
- In a cover width of 32 inches.
- With deepest corrugation — a full ⅝-inch — of any standard steel centering.
- Plain or Bonderized with an exclusive baked-on duPont red oxide primer that provides weather protection and serves as an excellent primer base for further painting of exposed underside. Fab-Form's special protective finish prevents water stain or "white rust."

Fab-Form's uniform strength comes from high-tensile (90,000 to 100,000 psi), 27 gage, cold rolled steel sheet.

- **Ideal for School**—One of the first construction jobs in which Fab-Form was used was the new St. Regis Church and School in Trafford, Pa. Architect for the job was Ermes Brunettini, AIA, Verona, Pa. More than 33,000 square feet of Fab-Form supports three-inch concrete floor and roof slabs set on steel joists.

Thomas A. Laboon, job superintendent for H. Justin Brown & Son, general contractors from Mt. Lebanon, Pa., said that the deeper corrugations in Fab-Form helped make a stronger slab. Pittsburgh Steel's six-inch square mesh made of No. 6 gage wire was used for reinforcing.

Fab-Form's speed of installation also impressed Mr. Laboon. He said that it took four men just one day to lay 10,800 square feet of Fab-Form on roof joists. After sections were laid, welders using the unique Fab-Form Welding Washer Stick made plug welds to every other joist.

- **Easy as A, B, C**—Welders found using the exclusive Fab-Form Welding Washer Stick unusually simple. Pittsburgh Steel developed the unique stick so that each welder bent up the end washer on the stick, made his plug weld and snapped off the washer—in just seconds. This eliminates fumbling in heavy gloves for individual washers. Next, mesh was installed and the slab was poured.

"Everything came out exactly right with no scrapped material," said Mr. Laboon in commenting on the economy of Fab-Form. "The side and end-lapping worked out exactly right.

"On top of that," he added, "you know that when Fab-Form is down you have a material that will take a beating from men tramping on it, buggies and even rough weather.

"Later, after the slab is poured,

Deepest corrugation, ⅝-inch, of all standard steel centering is available with Fab-Form. Job Superintendent Thomas A. Laboon, left, shown with Pittsburgh Steel Products Salesman C. W. Bainbridge Jr., said deep corrugation helped make a stronger slab.

Rugged Fab-Form, longest and widest corrugated steel centering for concrete floor and roof slabs on the market, easily supports a three-inch roof slab. Fab-Form saves material and erection time.

you are confident that the same material will go a long way in helping provide sound construction."

Join the growing list of satisfied Fab-Form users. Your first application will convince you of Fab-Form's advantages . . . from Pittsburgh Steel Products Division, a leader in the construction products field for more than 30 years.

Write today for literature or, better yet, contact the nearest Pittsburgh Steel Products sales office listed here.

Exclusive Fab-Form Welding Washer Stick reduces installation time. After the end washer on the stick is bent up, the welder makes a plug weld and snaps off the washer. Then mesh is installed and slab is poured.

Pouring is no problem with Fab-Form. Here a buggy has rolled over Fab-Form without damaging the material. Six-inch square mesh made of No. 6 gage wire is from Pittsburgh Steel, too.

Fab-Form

Pittsburgh Steel Products

a division of **Pittsburgh Steel Company**

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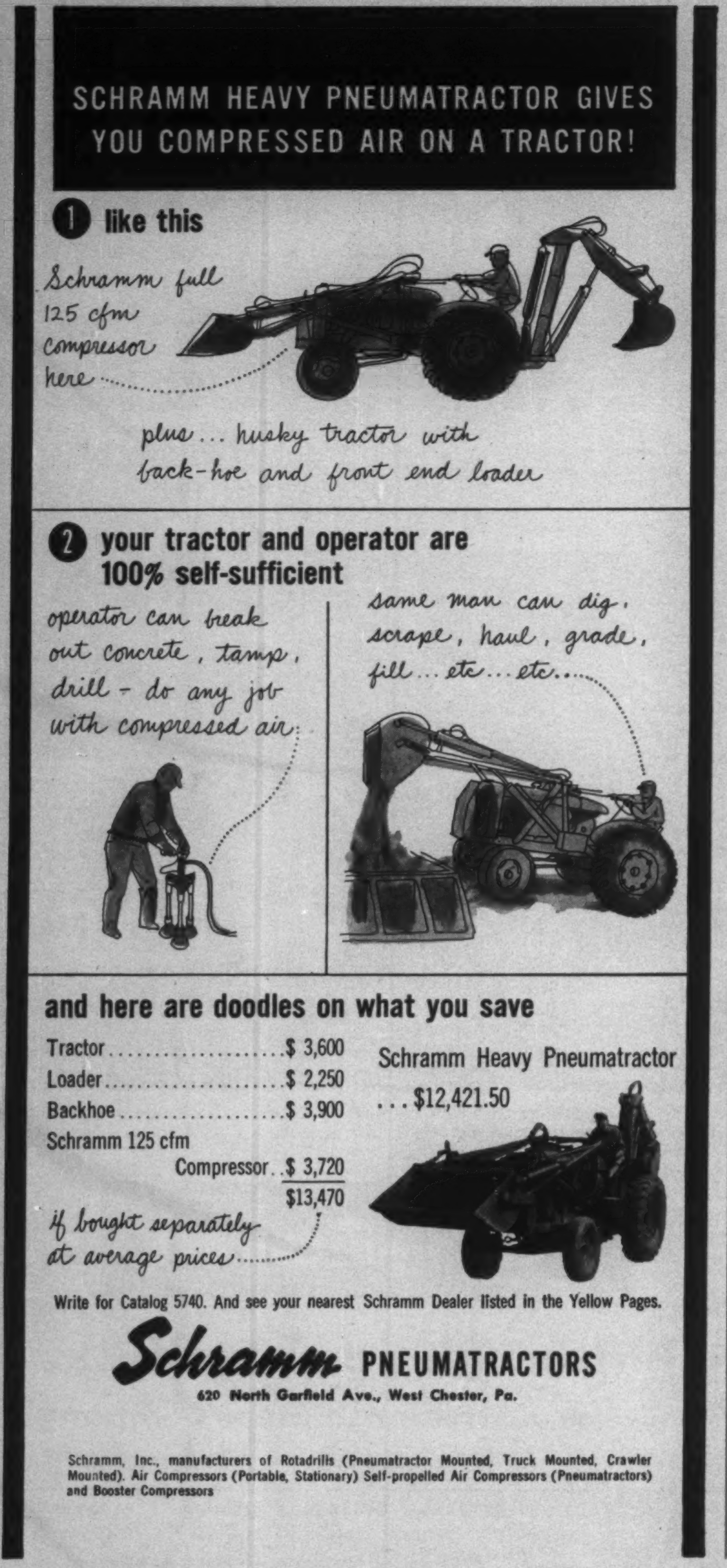

SCHRAMM HEAVY PNEUMATRACTOR GIVES YOU COMPRESSED AIR ON A TRACTOR!

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② your tractor and operator are 100% self-sufficient

operator can break out concrete, tamp, drill - do any job with compressed air

same man can dig, scrape, haul, grade, fill ... etc ... etc ...

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Schramm, Inc., manufacturers of Rotadrills (Pneumatractor Mounted, Truck Mounted, Crawler Mounted). Air Compressors (Portable, Stationary) Self-propelled Air Compressors (Pneumatractors) and Booster Compressors

ment equipment on the grounds that the contract required a written order for extra work. The subcontractor sued and recovered.[1]

The court held that where extras were incurred because of change orders from the government, and the prime contractor had not protested performance of the extra work without a written order, such conduct constituted a waiver of the requirement of a written order for the extra work.

(1) Cooltronic Corp. of America v. Lieb Bros., Inc., 152 N.E. 2d 886, Appellate Court of Illinois, July 23, 1958.

Subcontractor Is Liable Under Indemnity Clause

The typical indemnity clause in a subcontract permits an owner's insurers to recover from the subcontractor amounts paid to settle claims flowing from the work of the subcontractor.

In an illustrative Ohio case, Upson-Walton Co. engaged The Leonard H. Krill Co., as general contractor, to erect an office and factory building. Krill subcontracted the structural steel work to Kilroy Structural Steel Co.

The subcontract contained the following provision: "The subcontractor shall indemnify and save harmless, the owner, the architect, the contractor, and their respective agents, from any and all liability, payments and expenses of any nature, for injury or death to any person, or persons, or for damage to any property, caused or alleged to have been caused by the subcontractor, or incidental to the execution of work under this contract by the subcontractor, his agents or employees * * *"

While Kilroy was engaged in erecting the structural steel, one of its employees, a man named Holt, was injured in the course of construction. The injury to Holt was caused when a wire with a high voltage of electricity broke and came in contact with him. Holt then sued Upson-Walton Company. Kilroy was asked to defend this suit which he refused to do. The case against Upson-Walton was settled by the attorneys for the casualty companies, who took contracts of subrogation in order to proceed against Kilroy.

The casualty companies brought an action against Kilroy to collect the sum paid in settlement to Holt, plus the attorney's fee paid in the settlement of the action and obtained a recovery. The judgment was affirmed on appeal.[1]

(1) New Amsterdam Casualty Company and American Mutual Liability Ins. Co. v. Kilroy Structural Steel Co., 159 N.E. 2d 797, Court of Appeals of Ohio, July 22, 1959.

Publications

Want More Infomation on Equipment, Materials?

Use ENR's inquiry card to order the publications you want all at once. The card is on page 263

Construction Equipment

Base material mixer

Uses, construction and operation of mixers for stabilized road base materials are given in four page folder. Mixer capacities range from 125 tph to 600 tph. Eagle Iron Works. 401

Batching plants

Eight-page catalog contains details, specifications, and photographs of portable batching plants with capacities up to 800 cu yd per day. The Boardman Co. 402

Batching plant

The Noble-Mobile, a portable batching plant is described in four-page colored folder. A schematic drawing shows location of aggregate bins, cement silo, feed screws and other details. Noble Company. 403

Batcher

A dustless dual batcher with a 32 cu ft capacity is the subject of a two-page bulletin. Heltzel Steel Form & Iron Co. 404

Automatic batcher

One-page bulletin explains advantages of automatic system for cement batching. Engineered Equipment Inc. 405

Vibrating feeders

A 12-page, two-color booklet gives specifications of and applications for vibrating feeders. Link-Belt. 406

Screw conveyors and feeders

Seventy-six-page book shows 20 types of screws, 14 troughs. Discharge and feeder openings for conveying, elevating, mixing, heating and cooling bulk materials are covered. Link Belt Company. 407

Screed

A screed attachment for a paving spreader that eliminates the need for an extra finisher. Blaw-Knox. 408

Subgrader

The Model GC precision subgrader is pictured in detail in eight-page, two-color booklet. General specifications, adjusting procedures, hydraulic system, strike-off and controls are explained. Blaw-Knox. 409

Turret derrick

Three-in-one aerial lift, universal derrick and digging machine described in 14-page folder. Truck Equipment Company. 410

Crawler crane-excavator

The important features and specifications and uses for the 65 ton Manitowoc Model 3400 are illustrated in a colorful catalog. Manitowoc Engineering Corp. 411

Crane-excavator

A 20-page, two-color booklet shows construction details and field uses of the American 200 Series truck crane which can serve as a dragline, backhoe, truck crane, or pile driver. American Hoist & Derrick Co. 412

Crawler crane-excavator

A 24-page catalog on the American 300 Series crawler crane illustrates various components of the machine and shows its use as a clamshell, back hoe, dragline, and pile driver. American Hoist & Derrick Co. 413

Crane excavator

The single engine, one-man operated, Unit Model 357 Mobile Crane which has a 15-ton capacity is described in a 12-page catalog. Unit Crane & Shovel Corp. 414

Crawler crane

The components of Lorain's 2½ yd. Model L85A are profusely illustrated in a 24-page brochure. Also pictured is a number of booms which can be used with the machine. The Thew Shovel Co. 415

Truck crane

Photographs and schematic drawings contained in six-page folder show components of the Little Giant Model 24, an 11-ton crane which can be converted for use as a shovel, trench hoe, clamshell, dragline or pile driver. Little Giant Crane & Shovel, Inc. 416

Truck crane

Photographs, cutaway drawings and specifications tell the story of the Lorain 760, a 65 ton truck crane. Four pages. The Thew Shovel Co. 417

Motor scraper

Specifications, construction details and job uses of the TS-360, a 30-cu. yd., hp. motor scraper are pictured and listed in a 20-page stiff-backed booklet. Allis-Chalmers. 418

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Earth mover

The Model B Tournapull—largest self-propeller scraper in the LeTourneau-Westinghouse line is depicted in 16 page catalog. LeTourneau-Westinghouse. 419

Earth movers

Two, 16-page, three-color booklets describe the 19-ton Model 65 Payhauler and the 27-Ton Payhauler. Engine and corrugated body details are given particular attention. International Harvester Co. 420

Tractor shovels

Two bulletins explain the engineering features and specifications for the Model 134 and 164 Trojan tractor shovels, and include information on the three sizes of buckets which can be used on each model. The Yale & Towne Manufacturing Co. 421

Tractor shovel

An eight-page, color booklet provides specifications, operating procedures and servicing information for the HD-11G tractor shovel, a 111 hp machine with a 2¼-yd capacity. Allis-Chalmers. 422

Pipelayer

Four-page booklet provides pictures and specifications of the Caterpillar No. 572 Series D and MD7 pipelayers. Caterpillar Tractor Co. 423

Crawler tractor

Booklet provides pictures of job applications, cutaways and sectional views of the Euclid C-6 crawler tractor. 24 pages. Euclid Div. 424

Wheeled tractor

Detailed specifications are available for a four-wheel drive, four-wheel-steer, rubber-tired tractor. NAPCO Industries, Inc. 425

Wheeled tractors

Eight-page folder shows Ford tractors being used for maintenance work such as street sweeping, mowing, mulching, removing snow. Ford Motor Co. 426

Motor grader

Structural features, power plants, both gasoline and diesel controls, attachments and accessories for the Model D Motor Grader are pictured and explained in a 16-page booklet. Allis-Chalmers. 427

Motor grader

A 16-page, color bulletin describes the construction and operation of the 8-D, 9-D, 10-D and 11-D motor graders with standard transmissions. Huber-Warco Co. 428

(Turn the page)

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For More Information . . .

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Graders

Flyer contains performance data and pictures of crawler tractors, bulldozers, skid-shovels, side-booms, and scrapers. International Harvester. 429

Construction equipment

A 20-page catalog illustrates and gives specifications for much of the construction equipment manufactured by the Caterpillar Co. Also includes brief specifications for Caterpillar engines and electric sets. Caterpillar Tractor Co. 430

Roller

Condensed specifications for the Ferguson 35-ton pneumatic roller presented in two-page folder. Shovel Supply Co. 431

Concrete truck bodies

Agitator truck bodies of 4, 6½ and 8 cu yd sizes for the transport of central mixed concrete shown in four-page brochure. S & M Manufacturing Co. 432

Trailer

Pictures, drawings and tables tell the story of several models on high-flat trailers, including extendable trailers with a closed length of 35 ft and an open length of 55 ft. Rogers Bros. Corp. 433

Track-mounted welder

The self-propelled track-mounted Pay-welder, a mobile welding unit which carries two, 325-ampere dual welders with four leads is the subject of four-page folder. International Harvester Co. 434

Hand torches

Thirty-six-page catalog describes the manufacturers line of gas welding and cutting hand torches, outfits, tips and accessories. Also included are specification charts. Air Reduction Sales Co. 435

Air compressors

A four-page bulletin describes the manufacturers line of industrial rotary stationary compressors. Davey Compressor Co. 436

Compressor

Four-page bulletin includes complete specifications, photographs, and a listing of exclusive design features of Model 600 RP Hydrovane rotary compressor. Davey Compressor Co. 437

Steam cleaner

The Series 3500 Hypressure Jenny is depicted in four-page, color folder which also includes table of major features and specifications for various models. Homestead Valve Mfg. Co. 438

Steam cleaner

Heavy-duty steam cleaners and combination steam and hydraulic cleaners are pictured in four-page folder. Dimensions, mounting, nozzle attachments and motors are covered in specifications sheet. Clayton Manufacturing Co. 439

Concrete equipment

Machines and accessories for the pneumatic placement of concrete are pictured and explained in four-page, color brochure. Blastcrete Co., Inc. 440

Concrete cutter

Six-page folder illustrates Models 257 and 367 Felker self-propelled concrete cutters. Felker Manufacturing Co. 441

Pavement smoother

The Concut Bump Cutter—a self propelled machine that eliminates bumps from concrete or asphalt pavements, removes paint and rubber from road and air-strip surfaces—is explained in one-page bulletin. Concut Sales, Inc. 442

Highway forms

Cam-lok highway forms which are locked together by a quarter turn of a cam are explained in a six-page, color folder. Heltzel Steel Form & Iron Co. 443

Sweepers

A cut-away drawing in eight-page brochure shows arrangement of components in a truck-mounted street sweeper. Mobil Sweeper. 444

Drilling machine

Portable drilling machines and diamond core drills for coring or drilling in reinforced concrete and other masonry materials are illustrated in eight-page booklet. Felker Manufacturing Co. 445

Diamond drilling

Four-page folder features equipment for diamond drilling through construction materials using portable equipment. Dura Diamond Tool Co. 446

Diamond drilling machines

Drill stands and drilling machines and bits for horizontal or vertical drilling in masonry, using either electric or air motors are pictured and described. Truco Masonry Drilling. 447

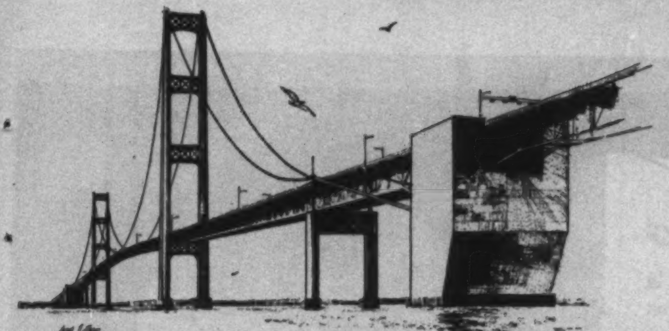
Drill bits

Detailed information, including specifications, assembly data and prices for Asco diamond drill bits is presented in a 16-page catalog. Anton Smit & Co., Inc. 448

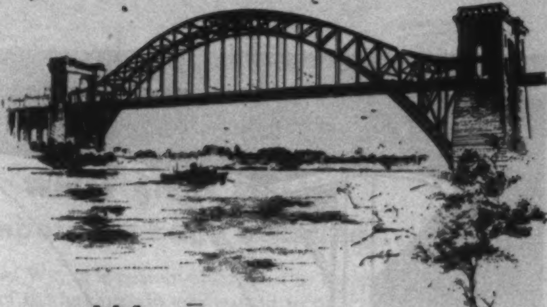
Rock drills

Eight-page bulletin describes a rock drill that uses an integral air motor to provide hammerless rotation for steel changing. Joy Manufacturing Co. 449

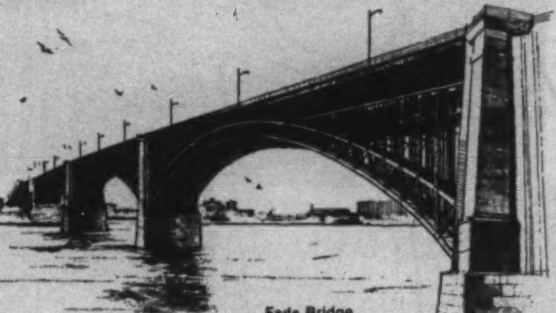
(*Publications continued p. 250*)



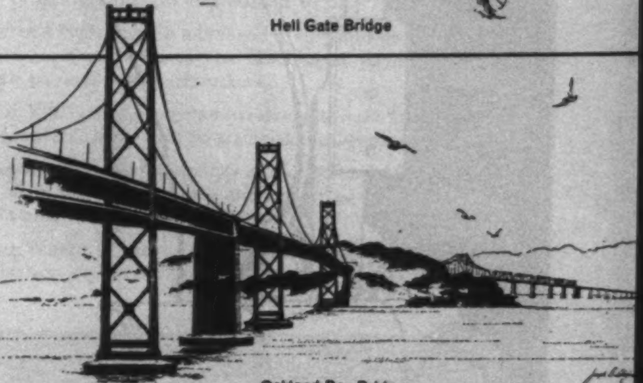
Mackinac Bridge



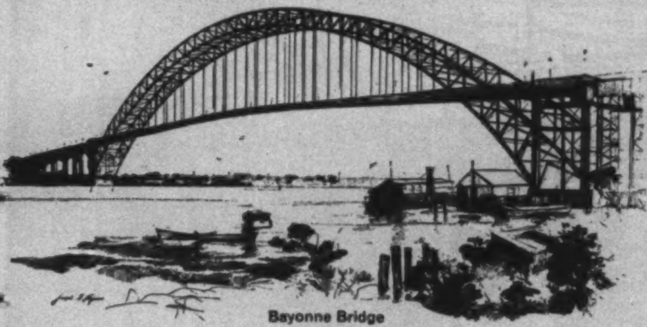
Hell Gate Bridge



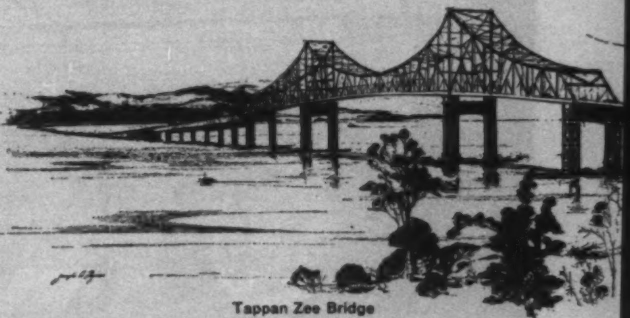
Eads Bridge



Oakland Bay Bridge



Bayonne Bridge



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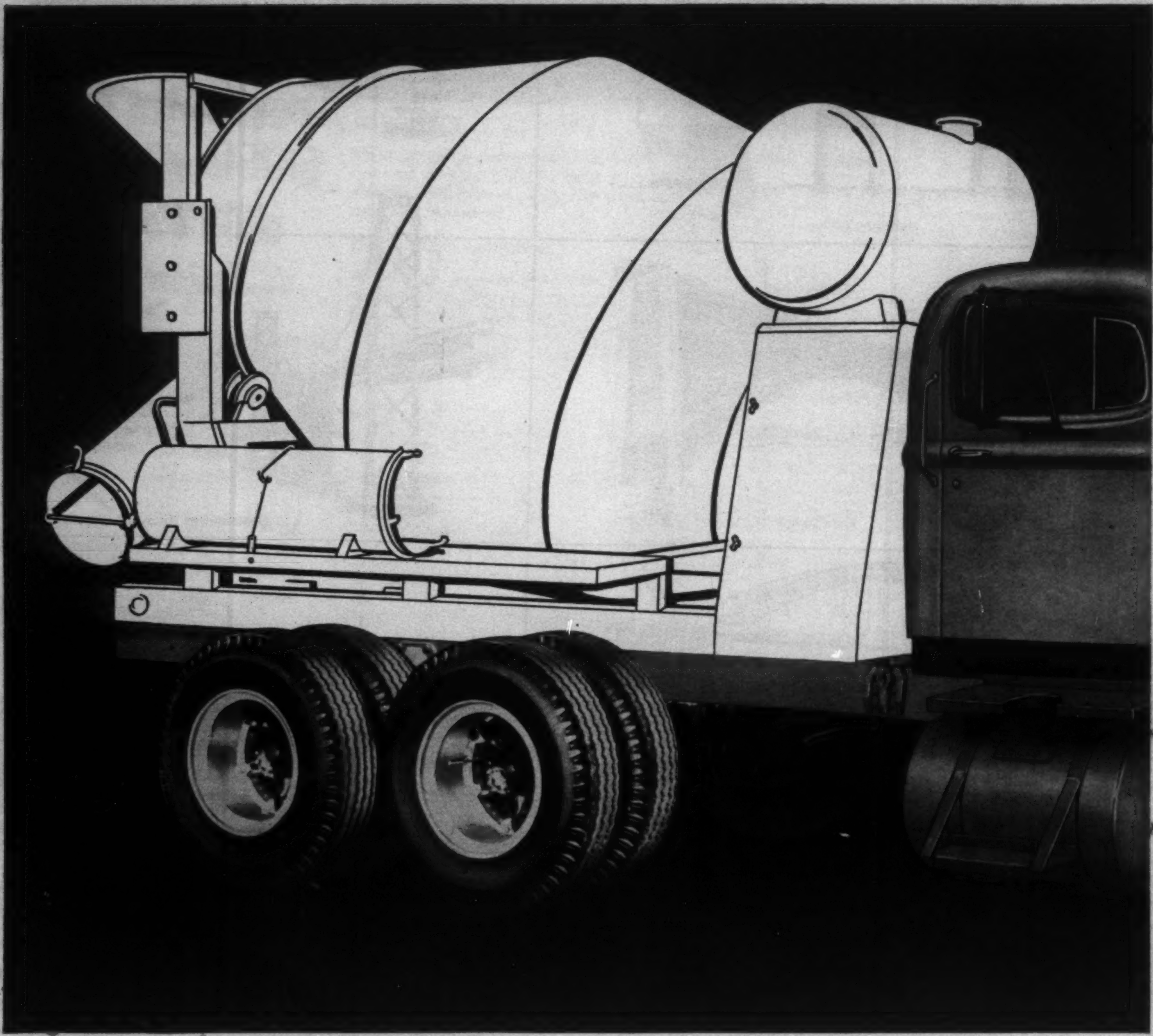

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Model 4264S. Medium-duty, 37,000-43,000 lbs. GVW. Takes a dump body or a 5- to 6-yard mixer. Heat-treated chrome-manganese-steel frame. White super Mustang valve-in-head 6-cylinder wet sleeve gas engine.

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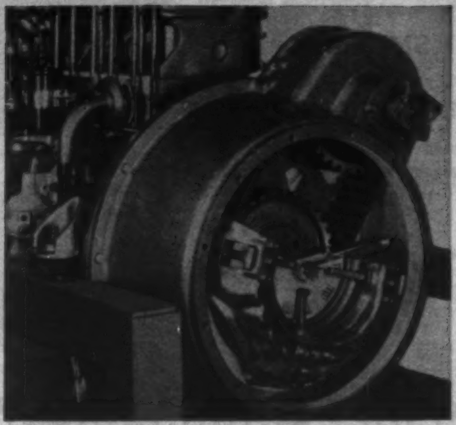

The belt was built to White specifications, and illustrates cog-pulley principle of new PTO. Belt has 27 helically-wound steel cables, encased in neoprene and nylon-covered for maximum life.

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Vibrator

Illustrations on general specifications for high frequency internal vibrator. Two-page flyer. Wacker Corporation. 450

Tampers

Catalog J-O shows the construction and use of Models J-13, J-18, J-36 tampers. Job photos and case histories are included. J. Leukart Machine Co., Inc. 451

Torque converter

Heavy duty torque converters for off-highway trucks and construction equipment are detailed in four-page folder. Clark Equipment Co. 452

Ripper

Construction, mounting details and specifications of rippers which can be used on the Caterpillar D4, D6, D8 and D9 tractors, and the 977 and 955 Traxcavator and they are presented in eight-page booklet. Caterpillar Tractor Co. 453

Compactor

Two-page flyer illustrates the use of the Vibro-Rammer, a self-contained gasoline-driven compactor. Wacker Corporation. 454

Hoisting equipment

Bulletin illustrates 80 items which can be used for hoisting, ranging from towers and slings to stiffleg derricks with 100-ft booms. Downs Crane & Hoist Co. 455

Hoisting equipment

Four-page folder illustrates 21 types of swivels, swivel hooks and safety hooks. Miller Swivel Products, Inc. 456

Handling equipment

A wide variety of equipment for moving drums. Four-page bulletin. Downs Crane & Hoist Co. 457

Clutch reference manual

A 104-page manual provides information on replacement clutch plates and facings and brake linings for all principle makes of tractors, construction equipment and materials handling machines. S. K. Wellman Co. 458

Building Materials

Standard metal buildings

Wide variety of buildings, from homes to hoppers and firestations are possible with standard metal units. Four-page brochure. The Parkersburg Rig & Reel Co. 459

(*Publications continued p. 252*)

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with HALE Contractor's Pumps

Now you can pick the pump that serves your purpose best! No matter what your de-watering problem may be (drainage, springs, surface water, flooding) or where it may be (man holes, excavations, cellars, ditches, etc.), there's a Hale pump to handle it and at the lowest possible cost. Here's why!

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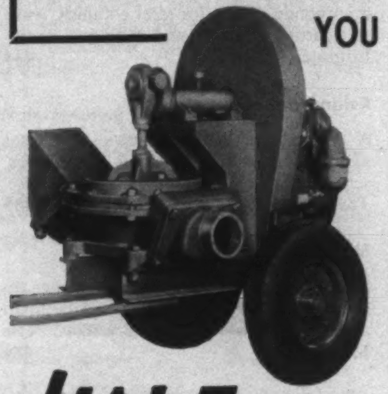

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Diaphragm Type 40DP, 4"
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Also Type 30DP, 3";
20DP, 2"; 15DP, 1½"

"Torrent" 25-T, 2"
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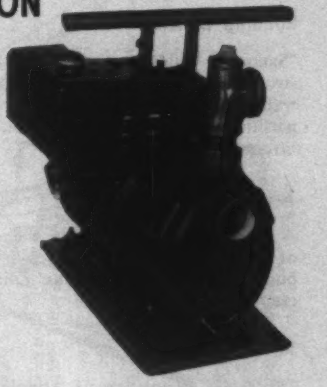
Also 30-T, 3"; 20-T,
2"; 15-T, 1½"



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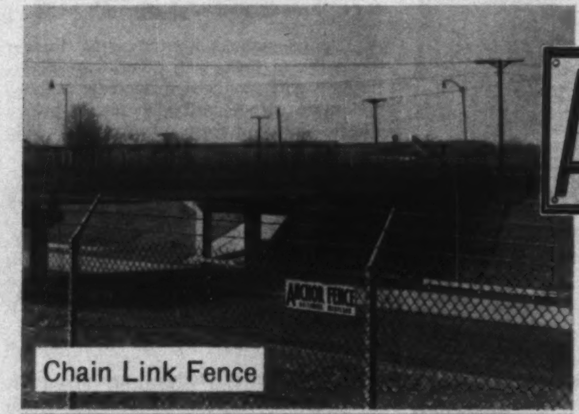

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ANCHOR POST PRODUCTS, 6540 Eastern Ave., Baltimore 24, Md.

CIRCLE 251 ON READER SERVICE CARD

Curtain and window walls

Metal curtain walls and pivoted window units detailed. Includes illustrations, specifications and complete detail drawings. Michaels Art Bronze Co. 460

Curtain walls

Materials, construction, mullion profiles and specifications of Lupton Curtain Walls. Michael Flynn Manufacturing Co. 24 pages. 461

Curtain wall systems

An eight page folder describes the properties of an integrated curtail wall system. Pittsburgh Plate Glass Co. 462

Building panels

"Sanpan" building panel, a translucent structural sandwich to be used for curtain walls, exterior wall panels and interior partitions. Eight-page booklet. Panel Structures, Inc. 463

Architectural aluminum

A 20 page guide assists in the selection of aluminum alloys and surface finishes for building industry applications. Olin Mathieson Chemical Corp. 464

Porcelain enamels

"Porcelain Enameling of Aluminum" describes the application of porcelain enamels to aluminum, covering alloy selection, metal preparation, enamel application, and firing. 22 pages, illustrated. Reynolds Metals Co. 465

Fiber glass panels

"Alsynite," a translucent fiber glass building panel, which has residential, commercial and industrial applications. Eight-page folder. Alsynite Co. of America. 466

Permanent steel forms

Fab-Form, a corrugated steel form available uncoated or with a baked iron-oxide primer coat described in four-page folder. Pittsburgh Steel Products. 467

Welded steel gratings

Load tables, grating styles, special order processing and tread patterns outlined in 16 page brochure, with instructions on how to specify grating requirements. Kerrigan Iron Works Company. 468

Steel doors

A 24-page catalog displays line of hollow metal doors and heavy duty rail and stile doors. Section drawings, types, sizes and dimension tables included. Amweld Building Products. 469

Tough timber

Ekki, a tough hardwood, is described with its uses in flooring, structural and high corrosion applications. Ichabod T. Williams & Sons, Inc. 470

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Fir plywood

A 16-page catalog contains up to date information of fir plywood standard grades and specialty products for the building industry. Douglas Fir Plywood Assoc. 471

Laminated wood

Design data, tables, and details of all types of laminated wood structural members—arches, beams, trusses, plank, and formwork—are given in a 20-page catalog. Rilco Laminated Products, Inc. 472

Roof decks

Plank and tile bulb-tee supported roof decks completely covered in 12-page bulletin. Tectum Corporation. 473

Gypsum slab reinforcement

Four page folder gives uses of keydeck galvanized wire reinforcement in cast gypsum on rock board roofs. Includes load table and description of tests. Keystone Steel & Wire Co. 474

Tubular products

A 12-page catalog on welded and fitted industrial, commercial and safety ornamental handrails. Tubular Products, Inc. 475

Precast concrete

Precast concrete T-beams, grade beams, rectangular beams and columns, and lintels are illustrated in four-page folder. The Flexicore Co. 476

Lathing and furring

20-page booklet contains fire-resistance ratings, design tables, specifications for hollow and solid partitions, ceilings and sound insulating partitions. Metal Lath Manufacturers Assoc. 477

Metal lath

Full line of flat, ribbed and reinforced metal lath, together with complete accessories and fire rating tables. Eight-page folder. Wheeling Corrugating Co. 478

Floor systems

Six-page bulletin describes Accomo-Dek, elevated floor systems for supporting electronic computers. Industrial Tubular Equipment Co. 479

Floor tile

Super Tuff-Tex, a greaseproof asbestos tile for industrial floors. Four-page catalog. The Flintkote Co. 480

Floor surfacing

Catalog describes epoxy flooring, non-slip coatings, and other floor applications. Also specialty products. The Flintkote Co. 481

Floor protectors

Concrete hardeners and terrazzo preservers for floors are described in a 12 page booklet. Watco-Dennis Corp. 482

Thermal insulation

Thermal insulations for commercial and industrial requirements in applications ranging from 400 deg F to 3000 deg F. 54-page catalog. Johns-Manville Sales Corp. 483

Lightweight fireproofing

Eight page booklet describes 41 approved fire rated construction systems containing perlite plaster and concrete. Consists of fireproofing details for steel columns, walls and partitions, floors and ceilings. Perlite Institute, Inc. 484

Rolling grilles

A four-page bulletin illustrates principal applications of rolling grilles for garages, school corridors, industrial plants, etc. The Cookson Co. 485

Skylights

Four-page catalog details and tabulates dimensional data on Marcolite Aluminum and Fiberglass Skylight Products. The Marco Co. 486

Aluminum fasteners

A 48-page handbook gives details, technical and dimensional data on aluminum screw fasteners. Reynolds Metals Co. 487

Nuts, threads and high-strength bolts

A 32-page manual illustrates the Equa-Stress thread form with a series of Elastic Stop nuts produced to increase fatigue endurance of standard high tensile bolts. Elastic Stop Nut Corp. of America. 488

Large fasteners

Bulletin shows complete line of heavy connectors including forged nuts, bolts, thread rod, sockets and turnbuckles in 1¾ to 12 in. dia sizes. Joseph Dyson & Sons, Inc. 489

Modular masonry

The advantages of modular masonry, with standards of design and layout as well as available types and colors of ceramic blocks, 80 pages and diagrams. Stark Ceramics, Inc. 490

Additives and preservatives

Catalog lists concrete curing compounds, concrete and asphalt additives, asphalt roof coatings, concrete floor hardeners, waterproofing compounds, and wood preservatives. 16 pages. Edoco Technical Products, Inc. 491

Galvanizing agent

Catalog gives physical and chemical properties of Dimetcote No. 3, inorganic zinc coat for "cold-galvanizing" steel surfaces. Amercoat Corp. 492

Concrete adhesives

Four-page catalog describes and tabulates properties of Epoxy alloys for joining concrete, preventing and sealing cracks at concrete joints. International Prestressing Corp. 493

Architectural sealants

The properties of "Pro-Seal" construction sealants are described in a four page folder. Coast Pro-Seal & Mfg. Co. 494

Sealant

A 16-page catalog describes Horflex Thiokol LP-32, a watertight sealant for joints and welds on curtain walls, prefab panels, glass enclosures, roofs, etc. A. C. Horn Companies. 495

Waterproofing

Eight-page catalog gives specifications, installation instructions, and architectural details of "Premolded Membrane" semi-rigid asphalt core board for waterproofing walls and slabs. W. R. Meadows of Canada Ltd. 496

Installed Equipment

Turbine pumps

Eight-page brochure offers details and color cutaways of water-lube or oil-lube deepwell turbine pumps. Impeller and bearing designs are also covered. Byron Jackson Co. 497

Power plant pumps

Boiler feedwater pumps, circulating and condensate pumps and auxiliary units for power plants described in six-page folder. Cutaway of a double case, high-pressure boiler feed pump given. Byron Jackson Co. 498

Proportioning pump

A positive displacement pump for proportioning concentrated corrosive chemicals described in two-page bulletin. B-I-F Industries, Inc. 499

Pumps

A line of electrically driven, lightweight pumps with capacities up to 80 gpm at 75 ft head are illustrated in a four-page brochure. Byron Jackson Co. 500

Condensation pumps

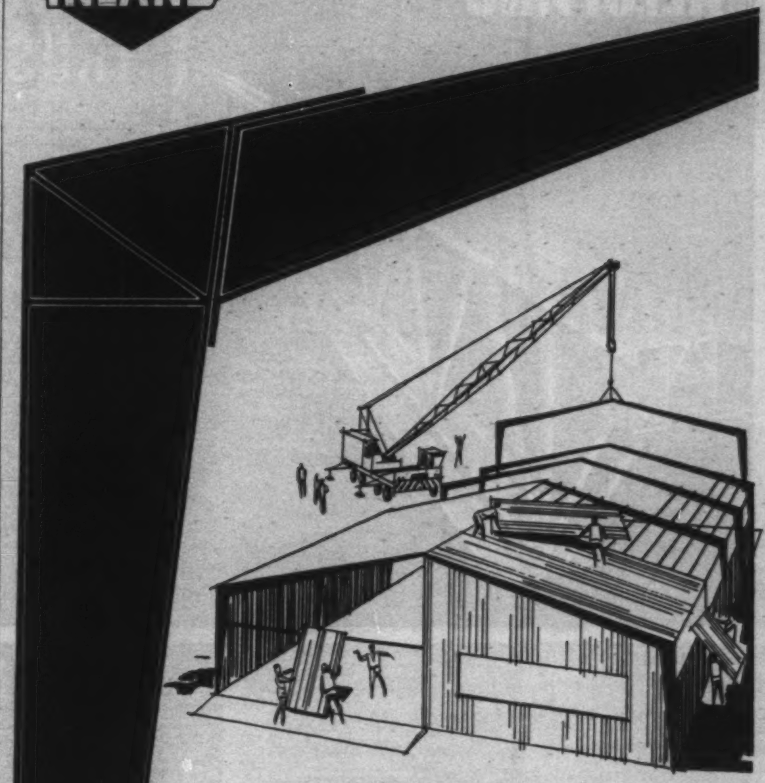
Bulletin describing condensation pump line. Included are design features, engineering data, construction and operation details and a pump selection check list. 12 pages. American Air Filter Co., Inc. 501

Metering pumps

Four-page, illustrated brochure describes application of controlled-volume pumps in water treatment. Schematic diagrams explain the automatic maintenance of phosphate in a water distribution system. Milton Roy Co. 502

(*Publications continued p. 256*)

INLAND STEEL BUILDINGS



YOU BUILD FAST

with Inland RIGID-FRAME steel building modules

There's no time lost when you erect an Inland RIGID-FRAME building. From drawing board to completion, your job goes faster. RIGID-FRAME structurals are designed to go up fast — fabricated at the factory to save you time on the job-site. You complete your building quickly, using metal panels, masonry, glass or other materials.

Unobstructed RIGID-FRAME interiors as wide as 120 feet make it easy to arrange efficient production lines, accommodate materials-handling equipment, plan flexible office and store layouts, and set up adequate warehousing facilities.

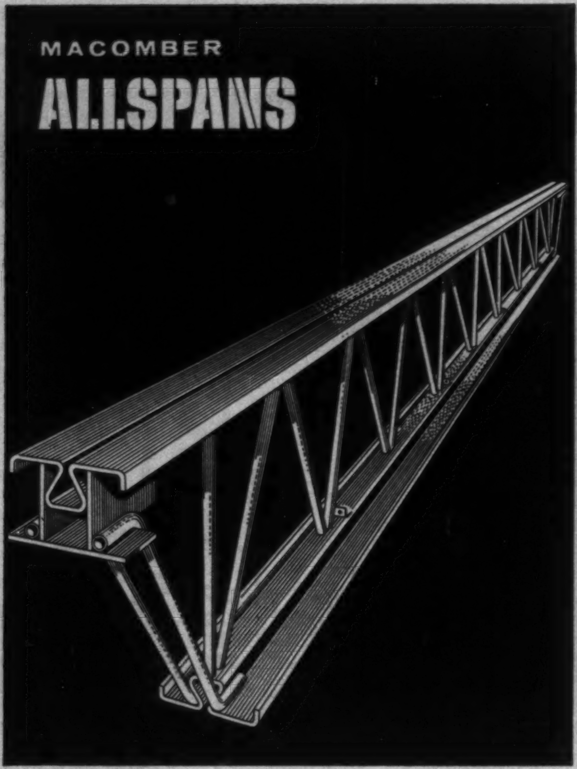
Write for the name of the Inland Steel Buildings dealer nearest you and a copy of our full color, 20-page catalog.

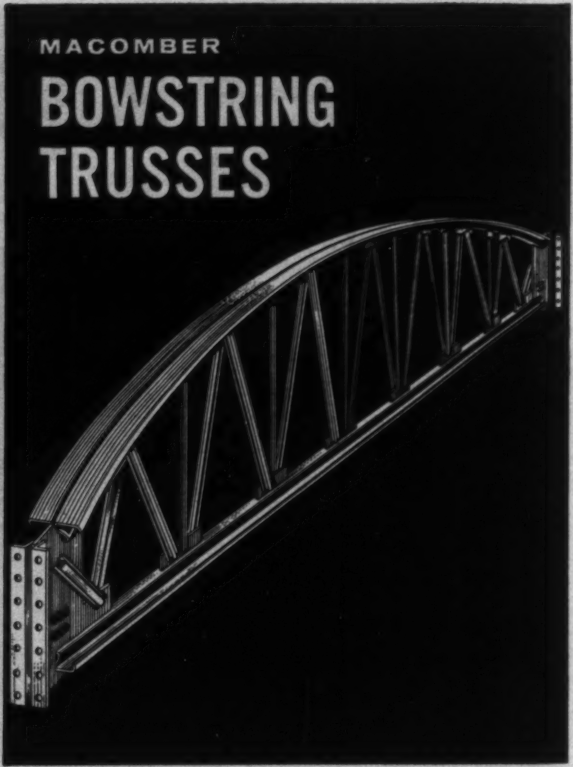
INLAND RIGID-FRAME STEEL BUILDINGS

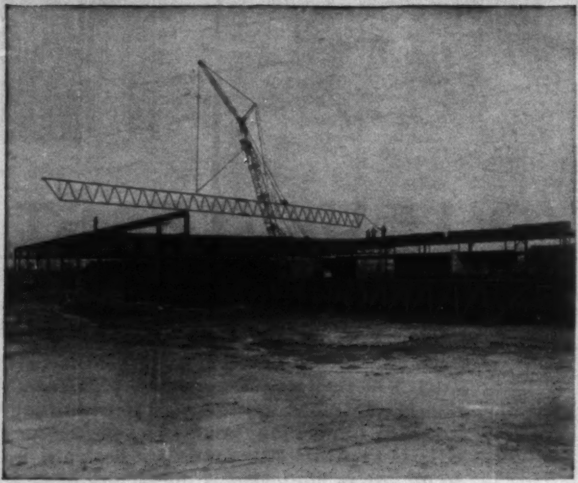
INLAND STEEL PRODUCTS COMPANY

DEPT. C, 4147 W. BURNHAM STREET, MILWAUKEE 1, WISCONSIN [illegible]

CIRCLE 253 ON READER SERVICE CARD






Bowling Lanes—Wilmington, Delaware

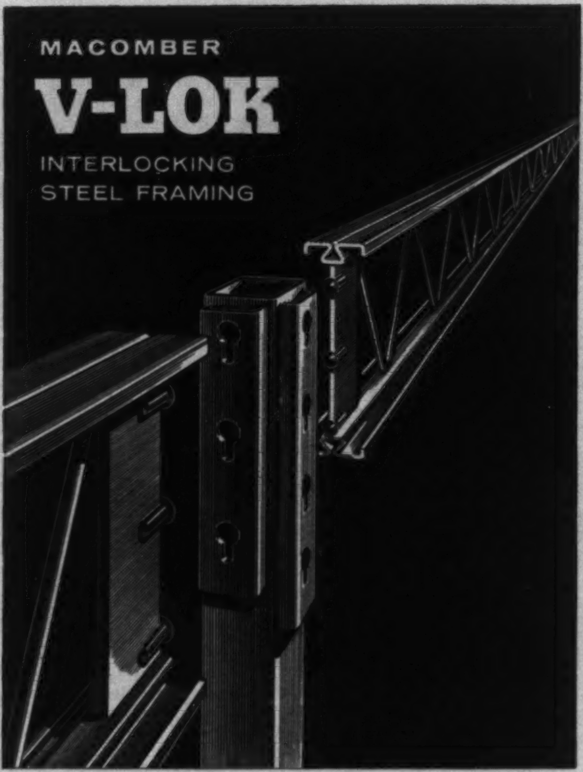
Sugar Warehouse—Guatemala City, Guatemala

SPANS TO 120 FEET—

Macomber high-strength ALLSPANS provide maximum lateral rigidity and reserve strength. This quality product covers the entire span range to 120 ft. without excessive weight — simplifies your design task.

STANDARDIZED TO SAVE DELIVERY TIME—

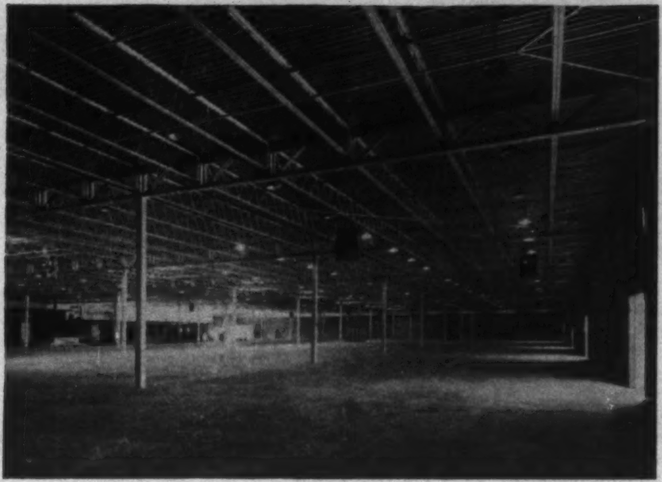
Macomber standardized all sizes of BOWSTRING TRUSSES to speed fabrication and delivery to your building site. Combined with ALLSPAN Purlins, Macomber BOWSTRING TRUSSES provide the most economical solution to wide-span framing problems.



MACOMBER ENGINEERED STEEL FRAMING

Your complete one-source supply for all structural steel requirements.

The Macomber line of structural framing anticipates every structural framing need. More than 36 years of pioneering experience in the design and crafting of framing steel are inherent in Macomber products. Integrity of manufacture plus nation-wide sales representation assure you "job-scheduled" delivery — complete product satisfaction.



Industrial Warehouse—Flint, Michigan

NO ON-THE-JOB BOLTING, RIVETING, OR WELDING—

Macomber V-LOK Interlocking Steel Framing reduces erection time from weeks to days, adapts readily to any architectural layout, collateral materials and mechanical installations.

LATEST PRODUCT FACTS:

Get your copies from your local Macomber Sales Representative or write today for these informative manuals. They'll save you time and money on your next job.

MACOMBER
ALLSPANS

MACOMBER
V BOWSTRING
STEEL TRUSSES

NAME________________________________
COMPANY________________ TITLE____________
ADDRESS______________________________
CITY____________________ STATE____________

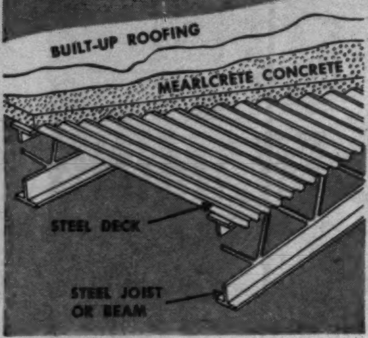
MACOMBER
CANTON 1, OHIO

ALLSPANS • V-LOK • V-BEAMS • V-GIRDERS
BOWSTRING TRUSSES • ROOF DECK • STRUCTURAL STEEL

SEE OUR CATALOG IN SWEET'S OR WRITE FOR COPY

CIRCLE 255 ON READER SERVICE CARD

MEARLCRETE
insulating
ROOF DECKS



fast

Place up to 30,000 square feet of roof deck or insulation in a single day.

lightweight

Permits savings on structural steel frame!

economical

Competitive with all other systems!

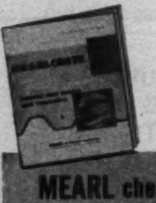
Pumped into place as insulating fill on galvanized corrugated steel decks, or as roof decks on form boards, Mearlcrete Foam Concrete offers many advantages over other systems. Here are a few:

CONTROLLED QUALITY — Mearlcrete is installed only by franchised trained contractors.

INCOMBUSTIBLE — 100% concrete reduces heat flow and flame spread.

LOW WATER CONTENT — Less than other poured decks...dries rapidly...pemits faster construction schedules.

HIGH INSULATING VALUE — Reduces initial cost and operating cost of heating and cooling plant.



WRITE FOR TECHNICAL BULLETIN R411A
with complete data on Mearlcrete Foam Concrete and the name of your local Mearlcrete contractor.

MEARL chemical corporation
220 Westfield Ave. West, Roselle Park, N.J.
CHestnut 5-9500

CIRCLE 256 ON READER SERVICE CARD

For More Information . . .
. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Cable elevators

Four-page brochure on different models of Hapman Hi-Lift Cable-Veyor Elevators. Conveyor Division, Hapman Corp. 503

Air conditioning

An eight-page bulletin describes line of evaporative water coolers. Drayer-Hanson Div., National-U. S. Radiator Corp. 504

Slurry filter

Continuous vacuum filtration of difficult slurries with a continuous belt drum filter. 12-page bulletin. Eimco Corp. 505

Vacuum filters

Two vacuum filters for industrial process water are featured in a four-page bulletin. Descriptions are included for both a 240 gpm concentric filter and a 720 gpm leaf-type unit. B-I-F Industries, Inc. 506

Membrane filter

Ten-page booklet describes a plastic filter material capable of removing submicron particles from fluids and gases. Gelman Instrument Co. 507

Sludge collectors

Two new series of sludge collectors for water, sewage and industrial waste treatment are described in 28-page booklet. Link-Belt Co. 508

Ventilators

Specs and capacity tables for line of electrically driven power ventilators. Four pages. Bowman Steel Corp. 509

Dust control

Descriptive information, and specs on a range of dry collection equipment showing application of units for collecting waste dust or returning reusable material. 28 pages. Draco Division of Fuller Co. 510

Glass-fiber tanks

Bulletin on tanks for water softener applications made of glass mat and polyester resin, using a centrifugal molding process. Apex Reinforced Plastics. 511

Ductile iron pipe

Application, properties and manufacture of ductile iron pipe and fittings are given. Line of joints and fittings are illustrated. James B. Clow & Sons, Inc. 512

Pipe

Eight-page catalog gives specs and descriptions of various types of pipe for water, gas and oil wells. EMSCO Screen Pipe Co. 513

Corrugated sewer pipe

Four-page folder describes riveted, corrugated metal sewer pipe with a smooth asphalt lining. Gives guide specs for 18 in. to 96 in. pipe and tables on sewer loadings and gages of metal pipe. Republic Steel Corp. 514

Lubricated plug valves

Two catalogs, one on lubricated plug valves, the other on valve lubricants are available. Homestead Valve Manufacturing Co. 515

Angle valve

A universal angle valve for liquid level gages, instrument piping and general use. Jerguson Gage and Valve Co. 516

Butterfly valves

A 36-page catalog on rubber-seated, butterfly valves contains information on valves designed for hydrostatic operating pressures up to 125 psi. Darling Valve & Manufacturing Co. 517

Wiring devices

Catalog displays protective covers for switches, receptacles, and other corrosion-resisting parts for electrical wiring. Harvey Hubbel, Inc. 518

Methods

Prestressed bridges

How prestressed, precast concrete trusses made up a 300-ft span bridge. Eight-page bulletin. Stresstell Corporation. 519

Welded bridges

"A Guide for Inspection Methods for Welded Highway Bridges". Eight pages. Air Reduction Sales Co. 520

Hydraulic dredging

Illustrated report tells how hydraulic dredging equipment can maintain power plant intake water channels and help in construction of new facilities. Ellicott Machine Corp. 521

Refacing buildings

Eight page color illustrated folder discusses the economics, how and why of applying new glass wall exteriors to old buildings. Pittsburgh Plate Glass Co. 522

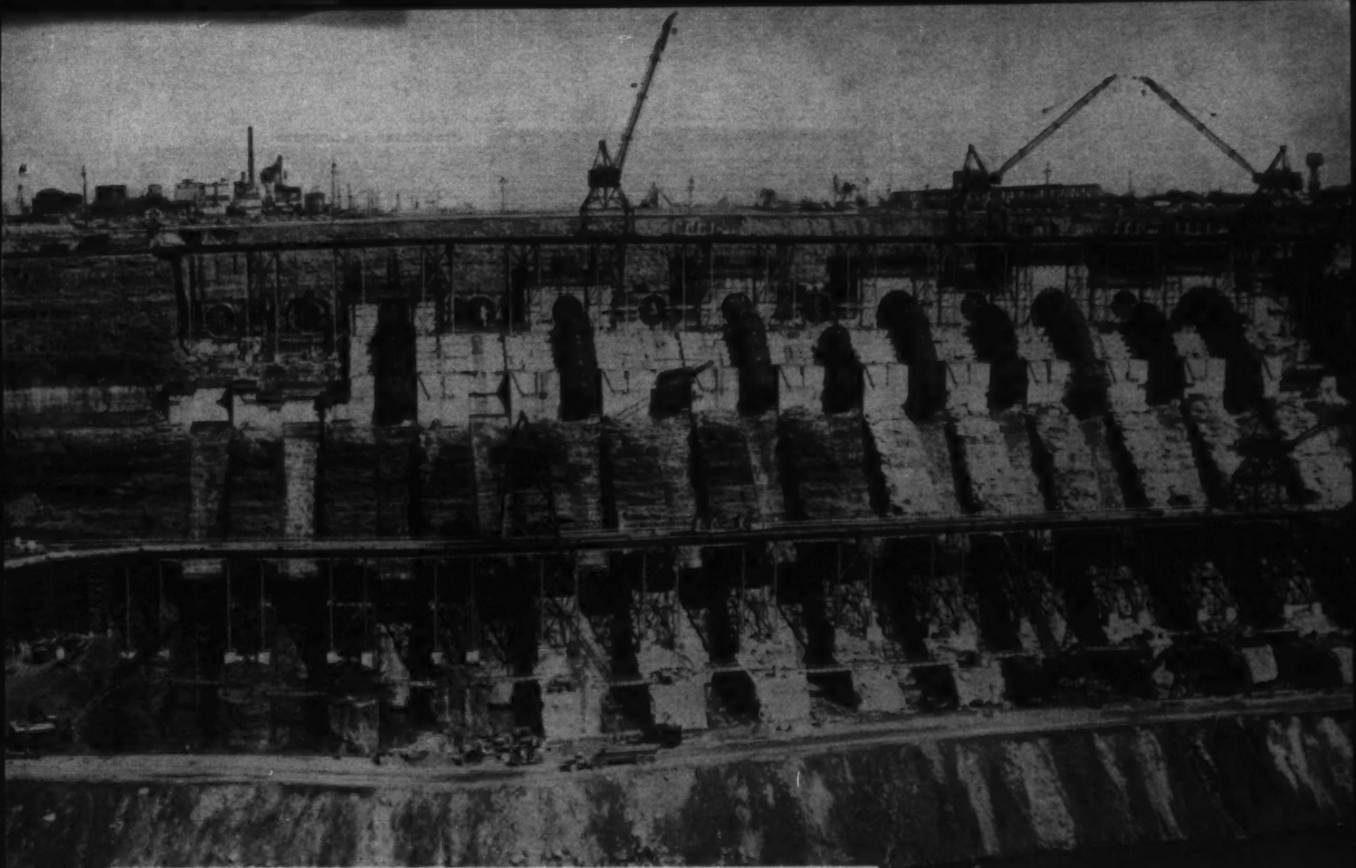
Asphalt paving

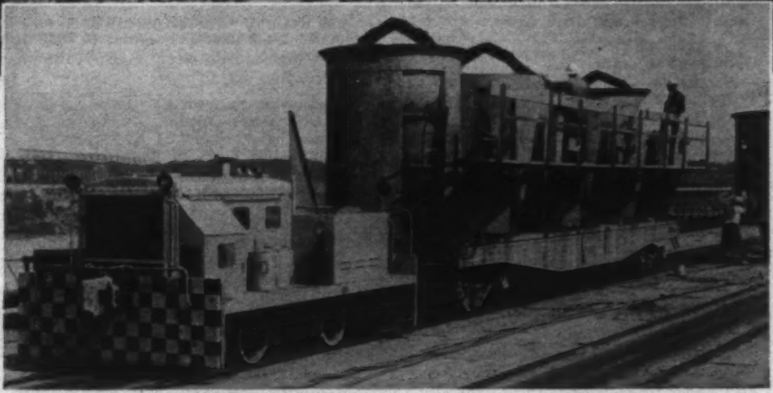
Information on the methods and materials used in heavy-duty, intermediate and low-cost types of asphalt construction. Two brochures. Texaco, Inc. 523

Drilling

A 16-page "Methods Manual" for general contractors, excavators and drillers shows how Calweld drilling equipment can be used in the installation of foundations, wells, cesspools and oil drilling. Calweld, Inc. 524

(*Publications continued p. 258*)





Main Generating Plant — Niagara Power Project — Lewiston, New York

Like a massive stage setting, viewed from the Canadian side, is the Main Generating Plant of the Niagara Power Project of the Power Authority of the State of New York. Located five miles below Niagara Falls, this power project will harness the full potential of the United States share of Niagara Falls. When completed, it will produce 1,950,000 KW of electrical power.

"Plymouth *versatility* speeds power project"

Six remote-controlled Plymouth Locomotives help speed construction operations for Merritt-Chapman & Scott Corporation, contractor for the main generating plant of the giant Niagara Power Project. In round-the-clock operations, these locomotives move concrete cars from the batch plants to the gantry cranes which place the concrete buckets in position for pouring.

Each Diesel-hydraulic Locomotive is operated from a control station on the concrete car, where the operator can oversee car spotting under the batch plant and attach the crane clevis bolts to the pouring buckets at the construction site. Visibility is excellent in both directions and full control is exercised without an operator on the locomotive itself.

Special problems find quick solution in Plymouth Locomotives. On-the-job dependability and minimum maintenance, coupled with smooth hydraulic power transmission have made Plymouth the choice on construction and tunnel jobs the world over. To check on a Plymouth Locomotive or Mine-O-Motive suited to your haulage needs, simply send a brief outline of your operations to: The Fate-Root-Heath Company, Dept. A-4 Plymouth, Ohio. Purchase Plans available.

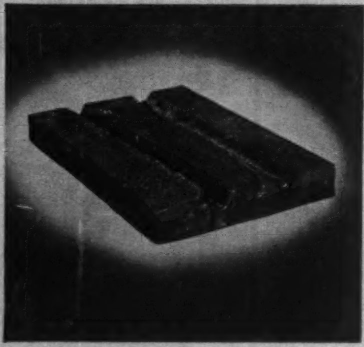
RAIL POWER

PLYMOUTH® LOCOMOTIVES

WITH TORQOMOTIVE DRIVE

PLYMOUTH LOCOMOTIVES
In Progressive Industry
throughout the world

CIRCLE 257 ON READER SERVICE CARD



Which cast iron groove was made in just 42 seconds?

The metal is cast iron. Grinding out the six-inch groove on the right took 5 minutes, 36 seconds. Using the Arcair process, the groove on the left was made in 42 seconds—*eight times faster!*

You can cut, gouge, bevel or groove *any* metal using the Arcair method—and get dramatic cost savings with an investment of much less than $100.

HOW DOES ARCAIR WORK? The torch utilizes air from an 80 p.s.i. air line, current from a welding machine and special electrodes to melt and remove metal. Fifteen minutes instruction is all an operator needs.

WHAT'S YOUR PROBLEM? Write us your specific problem. We'll give you a speedy and sincere answer.

Arcair

THE ARCAIR CO., 472 S. Mt. Pleasant St.
Lancaster, Ohio

Send me more information on Arcair Torches and special electrodes.

NAME__________
TITLE__________
COMPANY__________
ADDRESS__________
CITY__________ STATE__________
MY PROBLEM __________

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Industrial heating

A 64-page text provides data on industrial heating using direct fired heaters. Gives definitions of terms, heat loss calculations, air distribution, single and multiple installations, door heating, process heating, and fuel piping design. Lennox Industries Inc. **525**

Insulating air systems

A 16-min sound-strip film presents technical, non-commercial review on insulating air conditioning systems. Armstrong Cork Company. **526**

Insulation

Tests results of thermal conductivity of metals, insulating materials, and miscellaneous materials. Electrofilm Technical Service **527**

Prestressed concrete film

A 20-minute, sound-color, film illustrates the manufacture of prestressed concrete, and its advantages. Available to contractors, industry, government and schools. Colorado Fuel and Iron Corp. **528**

Grinding concrete

Proper speeds for wet and dry grinding, methods of smooth grinding walls, floors and ceilings. Four-page Bulletin. Stow Manufacturing Co. **529**

Concrete admixture

Bulletin tells how to reduce water content of concrete mixes. Eight pages. Dewey and Almy Chemical Division. **530**

Proper grouting

A 16-page booklet explains how to avoid grout shrinkage through the use of properly applied non-shrink grout. The Master Builders Co. **531**

Plaster aggregate

Eight-page bulletin gives instructions for proportioning Permalite expanded perlite plaster. Great Lakes Carbon Corp. **532**

Moisture and condensation control

Proper design techniques for controlling moisture and condensation in buildings treated in a 32-page technical review. W. R. Meadows, Inc. **533**

Sheet piling

A 24-page catalog on steel sheet piling discusses renting of sheet piling, illustrates applications, and details standard, rolled, and fabricated sections. Typical pile arrangements for rectangular and circular cofferdams and dimensions of pile cells also are included. L. B. Foster Co. **534**

Prestressed Concrete

Ten-page folder describes design and construction of an eight-story building framed with precast, prestressed members. Stresssteel Corp. **535**

Reinforced Masonry

A system of reinforced concrete construction using permanent masonry forms. 38-pages. Masonry Joint Industry Board. **536**

Insulating Concrete

Bulletin gives mix design, physical properties, and thermal conductivity of Permalite concrete roof decks. Eight pages. Great Lakes Carbon Corp. **537**

Epoxy compounds

A six-page bulletin describes the applications of Sika epoxy compounds for bonding, patching, joint and crack sealants, surface coatings for concrete, and for the resurfacing of pavements. Sika Chemical Corp. **538**

Welding practices

Specifications, symbols, theory, typical connections, shop practices and design tables and procedures covered in 66-page book. Saxe Welded Connections. **539**

Welding

A 40-page booklet explains preheating with electric strip heater systems to weld low-alloy, high-tensile steel. J. B. Nottingham & Co., Inc. **540**

Electro Pocket Guide

Contains all types of electrodes available from the manufacturer: mild steel, low alloy, low hydrogen, iron powder, stainless steel, hardfacing, non-ferrous and cast iron. 64 pages. Air Reduction Sales Co. **541**

Deck openings

Eight-page manual contains instructions for cutting openings in a Flexicore slab. The Flexicore Co., Inc. **542**

Roofing guide

Fourteen-page booklet describes roofing problems; how to correct them and what steps to take in repair maintenance. The Monroe Company. **543**

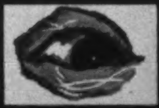
Power distribution design

Power distribution design book has sections on: types of electric power distribution systems; fault current calculations, secondary voltages, and the relationship of types of buildings to system design. 40 pages. Westinghouse Electric Corp. **544**

Wire Rope Data

Thirty-page booklet gives drum requirements, sheave groove data, information on the elongation of ropes, suggestions for reeving, tensions on rope for various grades, for suspended cables and for standing ropes. Pacific Wire Rope Co. **545**

(*Publications continued p. 262*)



SEE a demonstration by a specialist

CONCRETE FLOOR TREATMENT

Saves · TIME
· MATERIAL
· LABOR

ONE PRODUCT ONE APPLICATION 4-WAY PROTECTION

Western Electric Plant, Columbus, Ohio

1—CURES
2—HARDENS
3—SEALS
4—DUSTPROOFS

WEST CONCRETE FLOOR TREATMENT saves labor, materials and time. It can be applied immediately after troweling. Avoids delays after pouring. Replaces as many as three separate products and applications. Eliminates labor required for cleaning after delayed drying between the use of separate products.

for FREE demonstration or literature address:
WEST CHEMICAL PRODUCTS INC., 42-45 West St., Long Island City 1, N. Y.
Branches in principal cities • IN CANADA: 5621-23 Casgrain Ave., Montreal

WEST

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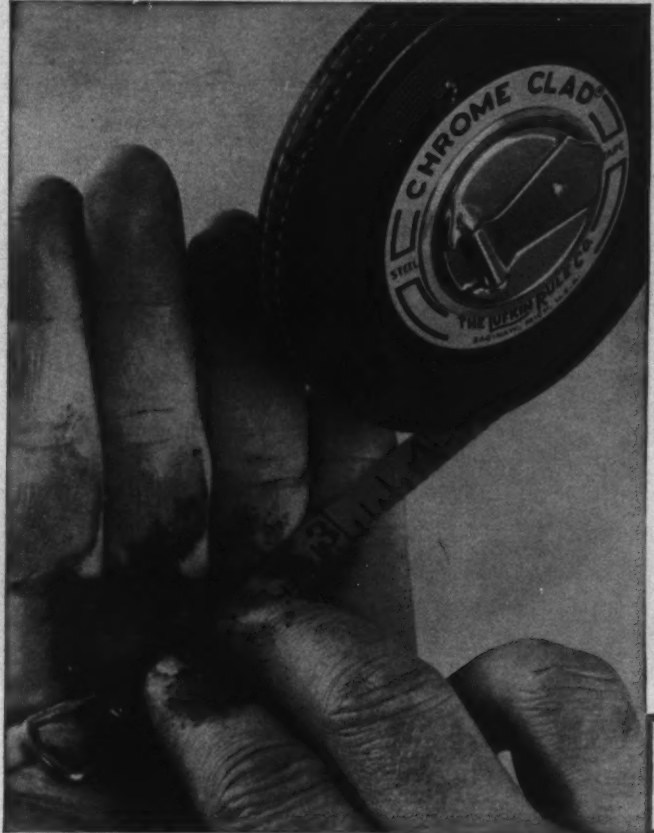


Gritty mud would mar the markings on most tapes!

This Chrome Clad® tape is Lufkin's 50-foot ANCHOR model. It *looks* quality in its hand-sewn leather case . . . it *is* quality.

A special kind of electroplating protects the tape from the damage of mud, sand and grit. The bold black markings are bonded to the steel base . . . protected by layer after layer of electroplating . . . topped by a final coat of tough chromium. Glare free, corrosion resistant, longer lasting—this is the tape preferred by every professional. Available with markings in feet, tenths and hundredths.

THE LUFKIN RULE COMPANY
TAPES • RULES • PRECISION TOOLS

CIRCLE 259 ON READER SERVICE CARD

PIPE THAT DOESN'T GET COLD FEET IN WET TRENCHES

This cast iron pipe was installed to carry water to an important industrial site in Indiana.

At the time of installation, weather conditions were severe; the trenches were wet and muddy.

Still, the cast iron pipe was easily and speedily assembled, enabling the contractor to complete the job well ahead of the deadline.

Cast iron pipe does not get cold feet over rugged soil conditions. Its rugged design, corrosion-resistant qualities, and bottle-tight joints will withstand the most severe pressures.

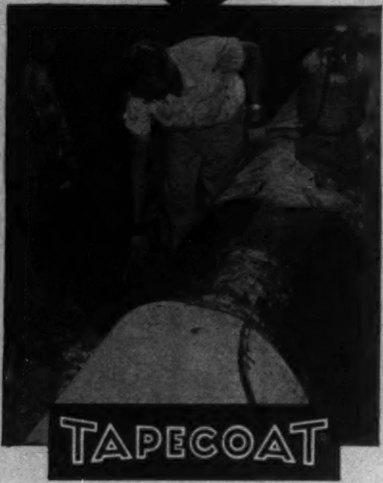
Modern, cement-lined cast iron pipe will deliver a continued full flow of water for at least a century . . . and rarely requires repairs or replacement.

CAST IRON PIPE RESEARCH ASSOCIATION,
Thos. F. Wolfe, Managing Director,
3440 Prudential Plaza, Chicago 1, Illinois

CAST IRON PIPE

THE MARK OF THE 100-YEAR PIPE

The **PROVED** *Way to*
CUT CORROSION
COSTS!



***Helps Add
Years of Service Life
to Underground Lines***

No other tape can match the 18-year protection record of TAPECOAT, the quality coal tar coating in tape form. Steel pipe and other vulnerable surfaces TAPECOATED back in 1941 still show no signs of deterioration.

Field application costs are lower with TAPECOAT because it is so easy to apply with the use of a torch. No trained help required.

TAPECOAT comes in rolls of 2", 3", 4", 6", 18" and 24" widths and is applied spirally or by "cigarette wrapping."

You can depend on TAPECOAT for protecting pipe, pipe joints, fittings, couplings, tanks, conduit, cable, splices, insulated lines, tie rods or wherever severe corrosive or abrasive conditions must be overcome.

A TAPECOAT sales and service engineer will be glad to assist you on your corrosion problems.

Write for Brochure and Prices

GEM

The TAPECOAT *Company*

Originators of Coal Tar Coating in Tape Form
1551 Lyons Street, Evanston, Illinois
Representatives in Principal Cities
Manufactured and Distributed in Canada by
The Tapecoat Company of Canada, Ltd.
25 Haas Road, Rexdale, Ontario

For More Information . . .

. . . Select the publications you want and circle the key numbers (shown at the end of each item) on the inquiry card at the end of this section.

Highway warning guide

The slide rule-type Dietz Hazard Warning Planner simplifies planning locations for roadside warning devices on construction sites. R. E. Dietz Co. **546**

Miscellaneous

Rust prevention

A 30-page manual includes complete specifications for coating structural steel, steel water tanks, production components, galvanized iron and other rustable metal surfaces. Rust-Oleum Corp. **547**

Corrosion protection

Four-page catalog describes Chasekote and Chasewrap on metal pipe to prevent corrosion. Chase & Sons, Inc. **548**

Calcium chloride

Basic data on the storage and use of chemical mixtures for de-icing roads given in a 28-page booklet. Calcium Chloride Institute. **549**

Pipe detector

A lightweight, transistorized pipe detector utilizing printed circuits is described in a two-page pamphlet. Computer Measurements Co. **550**

Adding machine

Color brochure describes and illustrates a pocket sized adding machine, that adds, subtracts and handles fractions. Alexander Drafting Equipment Co. **551**

Measuring wheels

Two brochures illustrate and explain complete line of measuring wheels. Rolatape, Inc. **552**

Ephemeris

A 1960 ephemeris is ready for surveyors and engineers. The 92-page astronomical almanac includes bound-in charts for simplified computation of Polaris. It lists 28 stars for determining stellar observations. Charts for the sun and Polaris are supplied. W. & L. E. Gurley **553**

Electronic surveying

Four-page, illustrated brochure describes electronic surveying instrument system that consists of two or more portable, tripod-mounted, interchangeable interogator-responder units. Cubic Corp. **554**

Surveying instruments

A three-color, 28-page catalog describes and illustrates line of transits, hand levels, plumb bobs, rods, allidades, tripods, graduations and stadia. David White Instrument Co. **555**

Soil testing

Engineering test equipment from pocket penetrometers to mobile testing laboratories are described in 316-page catalog. Soiltest, Inc. **556**

Scaffolds

Operation of "Gold Medal" Junior scaffolds, recommendations and diagrams for installations are given in an eight-page folder. Patent Scaffold Co., Inc. **557**

Flexible hose

A 38-page catalog gives details on a variety of flexible hose and fittings. Tables show construction, application, sizes and working pressures of different types of hose. Aeroquip Corp. **558**

Formwork

Four-page catalog illustrates and describes Roospeed Forming System, Rooshors, and Roos column clamps. Baker-Roos, Inc. **559**

Centrifugally cast concrete poles

Design, engineering standards, fabrication, testing procedures and erection methods for centrifugally cast concrete poles, are presented in an 8-page Engineering Bulletin. Betoma-North America. **560**

Concrete poles

Eight-page bulletin contains description and photographs of centrifugal casting of reinforced concrete poles. Centrifugally Cast Concrete Institute. **561**

Testing service

Eight-page brochure for engineers and architects describes a soils and foundation testing service. American Testing and Engineering Corp. **562**

Protective air structures

A four-page folder describes how vinyl coated nylon air structures can be used to protect a construction job during cold weather. Hoosier Tarpaulin & Canvas Goods Co. **563**

Tap selection

Ease of selection of taps for all types of material is the aim of a 28-page, four color catalog. Handy color charts clearly show what stock taps are available for all classes of thread fit. Hanson Whitney Co. **564**

Leak detectors

Six-page bulletin gives detailed instructions on the use of halogen leak detectors. Application discussed include hydraulic systems, steam boilers, valves and piping, and air-conditioning and refrigeration equipment. General Electric Co. **565**

Wire rope

Four-page condensed catalog lists weights and strengths of Improved Plow Steel and Extra Improved wire rope. MacWhyte Company. **566**

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573. New Reactors Spur Research for Inexpensive Nuclear Power—Here's the basic information you should have about the power projects of the future.

574. First Mechanized Post Office Has Unusual Barrel-Shell Roof—A difficult job, but contractor-engineer cooperation licked it.

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NOW longer-lasting, high-performing engines!

EXCLUSIVE NEW V-6

Life expectancy: 3 times longer! Completely new design, more compact and stronger! Actual tests prove these advanced V-6 engines can give you up to 200,000 miles of continuous operation without a major overhaul.

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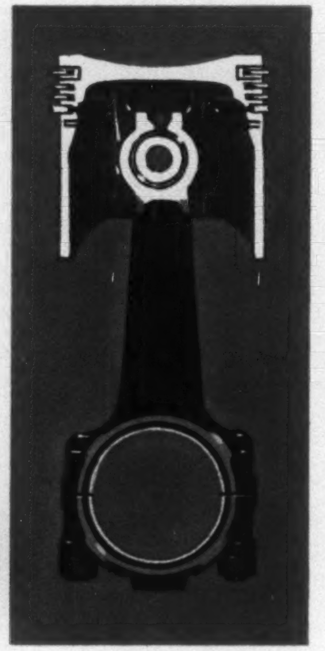
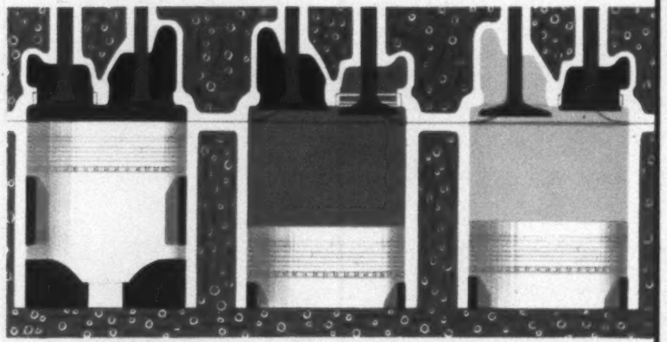
Most power of any standard gas engine! Highest torque over a broader, lower, easy-stroking rpm range saves fuel, reduces engine wear and cuts shifting up to 60%.



Pistons are exclusively GMC designed and built for best sealing and longest life. Special casting with the head down assures more strength at the top where it's needed. 4-ring pistons have cast-in steel band to control expansion. All pistons are extra-heavy-duty design, yet every one is precision balanced to 1.8 grams for vibration-free performance, measured to .0003 inches for a perfect fit.

Massive, high-strength GMC connecting rods are drop forged, heat treated carbon steel. Every one is precisely balanced to less than 2 grams tolerance for smooth, lasting operation.

New, big-diameter GMC bearings last 7 times longer than others. M400 bearings will take the heaviest loads under the most extreme operating conditions.



Longer engine life with 33% more cooling area, 3 times more water volume than comparable engines! Notice the extra-wide water passages that completely surround each cylinder! See the widest spaced valves with the biggest cooling area for rapid heat dissipation! No two exhaust valves are adjacent! New high-volume water circulation (up to 176 gallons per minute) assures less than *4 degrees* temperature variation throughout. These are the most efficiently cooled engines with every feature to eliminate life-killing "hot spots".

NEW GMC GAS ENGINES . . . PROFIT-PERFORMANCE ON EVERY HAUL		
Model	Gross Torque Range	Max. Horsepower
305A	258-260 @ 14-2200	150 @ 3600
305B	264-266 @ 11-2000	150 @ 3600
305C	268-270 @ 12-2100	165 @ 3800
351	308-312 @ 14-2400	180 @ 3400
401	375-377 @ 12-2000	205 @ 3200
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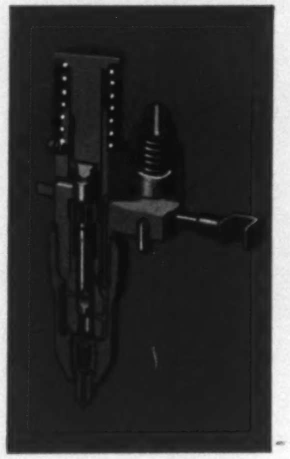
NEW V-6 DIESELS

Most power per dollar! New high-performance, fuel-saving GMC Truck diesels have proved, efficient 2-cycle design with power on every downstroke to give you more power per dollar, more power per pound, more power per cu. in. displacement.

New 6V-71 engines have all the proved performance, economy and durability features of the famous 71 Series, the power plants that are so well known in the construction business . . . in trucks and heavy-duty service equipment.

Only GMC Trucks have this economy range governor that positively controls engine speed in top gears at most efficient point for outstanding fuel economy.



Simplest, most practical and durable, and least expensive diesel fuel system of all! GMC's precision-built injector meters exactly the right amount of fuel to each cylinder, times the injection and atomizes the fuel for most efficient burning . . . eliminates troublesome high-pressure lines and complicated pumps.

- GMC Truck diesels have *four* exhaust valves per cylinder (not 1 or 2) for complete scavenging of all gases and freer breathing.
- Automatically save up to 5% fuel, get up to 7% extra hp. with the standard, exclusive hydraulic fan.
- Up to 530 pounds lighter than comparable horsepower diesel engines.
- Cut costly downtime and expense with complete one-stop parts and service at every GMC Diesel Truck Dealer.

POWER-MATCH YOUR JOB WITH NEW GMC DIESEL POWER		
Model	Max. Torque	Max. Horsepower
6V-71	577 @ 1200	189 @ 1800 or 210 @ 2100*

*No extra cost

See the Yellow Pages for your nearest GMC Dealer . . . for actual comparisons that prove GMC Truck superiority.

YOU CAN DRASTICALLY CUT YOUR HAULING COSTS

thanks to the BIG GMC BREAKTHROUGH in truck engineering

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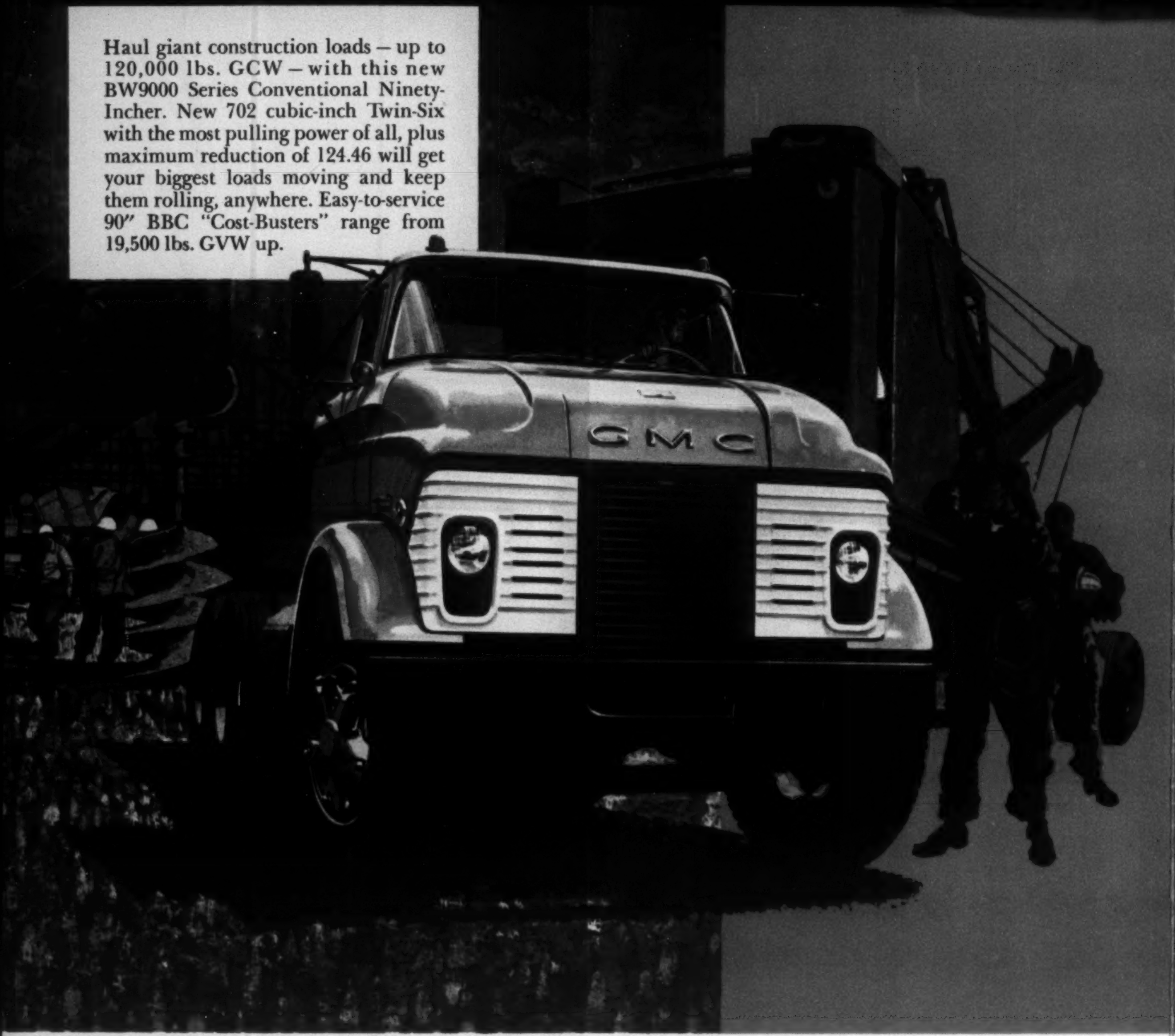
GMC
GENERAL MOTORS CORPORATION
TRUCKS

From ½-ton to 60-ton
General Motors leads the way!

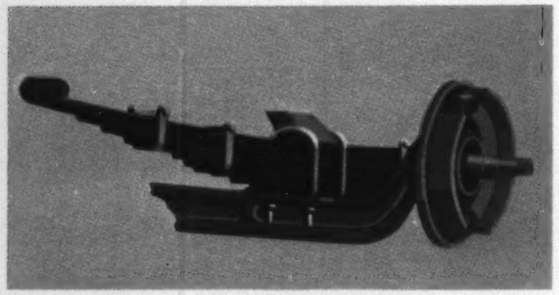
Haul giant construction loads – up to 120,000 lbs. GCW – with this new BW9000 Series Conventional Ninety-Incher. New 702 cubic-inch Twin-Six with the most pulling power of all, plus maximum reduction of 124.46 will get your biggest loads moving and keep them rolling, anywhere. Easy-to-service 90″ BBC "Cost-Busters" range from 19,500 lbs. GVW up.



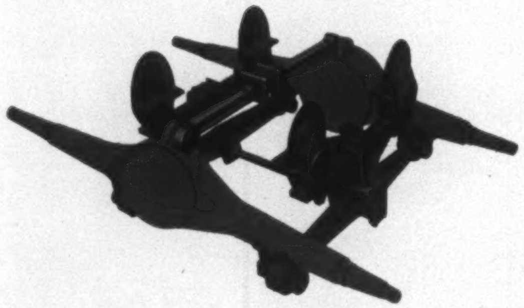
You can mount up to an 11-foot body on a 92-inch wheelbase, or practically *any* construction body on the new full line of GMC steel tilt-cabs. Turning circles are short as 33½ feet. Front vision is the best you can get. Payloads are bigger with front axle set back 52 inches. Full tilt of the 72″ BBC cab cuts service time and costs. Choice of responsive V-6 and Twin-Six gas engines or new V-6 diesel.

Here is new, practical styling and uncompromising ruggedness...new GMC pickups with frames up to 100% stronger, V-6 power with 3 times longer life expectancy and stronger axles. There is extra stamina and extra value in every one of the 34 combinations, including "go anywhere" 4-wheel-drive models. Other 105″ BBC Conventionals to 45,000 lbs. GCW. See them, drive them today.

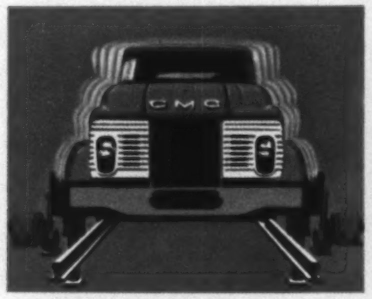
NOW you can cut job time, cut costs with the most advanced trucks in 20 years!



New, Stronger Front Suspension and Springs! New GMC heavy-duty models are easier to drive and last longer, too. You get increased stability, shorter turning and improved handling with longer-lived, wide-track I-beam front axles. New, longer, wide springs have more capacity, greater load-cradling flexibility.



Bigger Payloads, Less Maintenance! With this new GMC tandem suspension you have less unsprung weight, less truck weight for bonus payloads. Rubber mounts and bushings at all wear points practically eliminate service. True alignment of axles and equal load distribution at all times increase tire and axle life.



New GMC Double-Life Cabs! A man couldn't stand this "shake test" for 60 seconds, yet new GMC cabs can endure it for nearly two days . . . proof of superior construction and long life on every job.

Frames Up to 35% Stronger! Totally new design, new stronger and lighter materials make GMC Truck frames stand up under the constant tougher-than-normal construction hauling, permit you to carry bigger loads, too.

Longer Brake Life! You get cooler running, stronger and longer lasting brakes with GMC's new centrifuse drums . . . bigger lining areas give added lining life and quick, safe stops.

GMC Truck & Coach—a General Motors Division—Pontiac, Michigan

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Bids Asked—Low Bidders—Contracts Awarded—

Compiled by Business News Department—Engineering News-Record, 330 W. 42nd St., New York 36, N. Y., ELSIE EAVES, Manager
J. A. MAHONEY, M. WETZEL, M. E. SCIORRA, MARIE MORAVSIK, ELAINE CHOMYAK, ELIZABETH WERRA, ELEANOR QUERET, Reports,
J. H. WEBBER, E. R. HUBER, Statistics.

NEW ENGLAND

HEAVY CONSTRUCTION—BA

Mass., East Boston—HEATING PLANT—BA 3/23—Commonwealth of Mass. Port Authority, 14 Court Sq., Boston, MPA-1.014 heating plant for underground fuel oil storage, Logan International Airport. Approx. $95,000.

Conn., Darien—BA 3/29—Town Sewerage Comn., Town Hall, Boston Post Rd., 4,150 ft. 8 in. sewer system Holly Lane, Middlesex Rd., Noroton Ave., Contr. 24. $90,000. Plans deposit $15. Bogert & Childs, 145 E. 32 St., New York, N. Y., engrs. CD 11/24.

MASSACHUSETTS—BA 3/29—Commonwealth of Mass., Dpt. P. Wks., 100 Nashua St., Boston,

Cambridge—hy. work, Mass. Ave. F-376(1). $253,300. Plans deposit $25.

Mass., Melrose—HEATING, VENTILATING SYSTEM—BA 3/29—City, 31 Warren St., heating and ventilating system Calvin Coolidge School, Main St. $100,000. Plans deposit $20. Philip Foster Spofford, Main St., Andover, engr.

† **Mass., Bedford**—RUNWAY, OVERRUN, etc.—BA 3/30—U. S. Eng., 424 Trapelo Rd., Waltham, runway and overrun and trailer court annex, Lawrence G. Hanscom Airfield, ENG-19-016-60-51. $200,000-$300,000. Green Engineering Affiliates, Inc., 1177 Milk St., Boston, engr. CD 3/4.

Mass., East Boston—PARKING AREA—BA 3/30—Commonwealth of Mass. Port Authority, 14 Court Sq., Boston, Mass., MPA 1.013 parking area, Logan International Airport. **$600,000.** Plans deposit $20. CD 3/8.

† **Mass., Watertown** — WELDING RESEARCH LABORATORY FACILITIES—BA On Or About 4/12—U. S. Eng., 187 Westminster St., Providence, R. I., constr. welding research laboratory facilities, Bldg. No. 312, Watertown Arsenal, ENG-19-016-60-66. Approx. $24,000.

BUILDINGS—BA

Mass., Hyde Park—SCHOOL—BA 3/22—Most Precious Blood Parish, Chancery Office, 1 Lake St., Brighton, Mass., parochial school, Hyde Park Ave. $450,000. Plans deposit $10. John A. McPherson, 250 Huntington Ave., Boston, Mass., archt. CD 10/15.

Mass., Springfield—SCHOOL—BA 3/25—City, City Hall, elementary school, Greenway-Cherokee Drive Area. $845,134. Plans deposit $50. Elroy Webber, 2 Crescent Hill, Springfield, Mass., archt. CD 10/21.

Mass., Adams—PLANT ADDN.—BA 4/1—New England Lime Co., 260 Columbia St. (selected list bidders), 3 plant addns. $120,000.

Mass., Swampscott—HOUSING FOR THE ELDERLY—BA 4/5—Town Housing Auth., P. Wks. Dpt., Administration Bldg., Mass-SA, housing for the elderly, Proj. 667-1. $400,000. John J. Mahoney Assoc., 61 Jefferson Ave., Salem, archts. CD 2/17, under LB.

▲ **N. H., Durham**—APARTMENTS—BA 4/5—University of New Hampshire, Durham, faculty and married student apartments, Demerritt Rd. near Kinsbury Hall. $1,000,000. Plans deposit $100. Kohler & Isaak, 1880 Elm St., Manchester, archts. CD 1/29/59.

Me., Hallowell—CENTRAL HEATING PLANT, etc.—BA 4/6—State, Dpt. Mental Health & Correction, State House, Augusta, central heating plant and distr. sys., Stevens Training Center. $100,000. Plans deposit $25. Maine Engineering Service Co., 133 Court St., Auburn, engr. CD 4/14, under LB.

Mass., Amherst—DINING HALL—BA 4/8—Commonwealth of Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, U-59-1, Contr. 1, dining addn., University of Massachusetts. $549,300. Plans deposit $40. Kilham, Hopkins, Greeley & Brodie, 9 Arlington St., Boston, archts. CD 2/13/58.

BUILDINGS—SLC

Conn., New Haven—AUDITORIUM—Yale University, 119 College St., soon lets contract Mary S. Harkness Memorial Auditorium, Cedar St. $591,000. Douglas Orr, 111 Whitney Ave., archt. Henry A. Pfisterer, 111 Whitney Ave., engr. CD 2/4.

Mass., Needham—STORES—Philinorstan Realty Corp., 7 Fair Oaks Park, soon lets contract stores. $400,000. C. J. D'Amato & Assoc., 795 Boylston St., Boston, archts. CD 3/2.

Mass., Reading—CHURCH, etc.—R. C. Chancery Office, 1 Lake St., Brighton, soon lets contract church and rectory. Approx. $400,000. Scibelli & Tully, 6 Eastman Pl., Melrose, archts.-engrs.

HEAVY CONSTRUCTION—LB & CA

† **Webb & Knapp, Inc.**, 1500 Elm St., Stratford, Conn., LB **$68,820**, est. $71,300, maintenance dredging Camden Inner Harbor, CIVENG-19-016-60-35, MAINE. U. S. Eng., 424 Trapelo Rd., Waltham, Mass. Bids Mar. 10. CD 3/3.

† **C. W. Bagley, 15 Lincoln St., Augusta, Me., and The Bridge Constr. Corp.**, 283 Water St., Augusta, Me., (joint venture), CA **$684,490**, est. $896,000, noise measurement facility, Shipyard-Clark's Island site, NBy 28625, Spec. No. 28625/59, PORTSMOUTH, N. H. U.S. First Naval Dist., 495 Summer St., Boston, Mass. Bids Feb. 18, awarded Mar. 8. CD 2/29, under LB.

▲ **VERMONT**—State Dpt. Hys., State House, Montpelier, Bids opened 3/11,

Lane Constr. Corp., 965 E. Main St., Meriden, Conn., LB **$3,870,888**, est. $4,000,000. Contr. 2, highway work Interstate Rte. 89 and 2 bridges, 1-89-2 (7), Waterbury and Bolton. CD 2/24.

† **The Arundel Corp.**, foot Fulton St., Pier 5, Brooklyn, N. Y., LB **$327,351**, est. $288,234, remove material, incl. ledge rock, Fore River, Weymouth, CIVENG-19-16-60-24, MASSACHUSETTS. U. S. Eng., 424 Trapelo Rd., Waltham, Mass. Bids Mar. 8. CD 2/26.

Pittsburgh-DesMoines Steel Co., 200 E. 42 St., New York, N. Y., LB **$188,300.** Contr. 59/60-2 elevated water tank and steel reservoir, WOONSOCKET, R. I., City, Purchasing Agent, City Hall, Woonsocket, R. I. Bids March 8, CD 3/1.

Utilities Service Corp., 715 Elizabeth Ave., Elizabeth, N. J., CA **$235,950** underground addns. to electric distr. system, incl. Bridgeport Harbor cable to Yellow Mill Pond, Bridgeport, CA **$200,000** underground electric cables, 2½ mi. to Skiff St., Hamden, CA **$100,000** extend electric transmission lines to North Bridgeport, Bridgeport, CONNECTICUT. United Illuminating Co., 80 Temple St., New Haven, Conn., Grand total $535,950. Awarded March 8. CD 2/24.

Consolidated Constr. Co., Inc., 919 Albany Ave., Hartford, Conn., LB **$171,833** (9 bidders), Contr. 60-7, 11,600 ft. 8- to 12-in. sewer and 6,000 ft. 6 in. house con. laterals, Two Brook Rd., Clayton Drive, Two Stone Drive, Dorien Circle Area, Pasture Trail, Maple St., Griswold Rd., Boulter Rd., Randy Lane, etc., Rocky Hill and Wethersfield, HARTFORD, CONN. Metropolitan Dist. Bd. Control & Supply, 115 Broad St., Hartford, Conn. Bids Mar. 10. CD 3/2.

BUILDINGS—LB & CA

D. D. Purrington Co., Inc., 170 Brow St., East Providence, R. I., LB **$704,000**, est. $700,000, Proj. No. N.H. 30, Douglas Bldg. addns. at HOSPITAL, DOVER, N. H. Wentworth-Dover City Hospital, Central Ave., Dover, N. H. Bids Mar. 9. CD 3/4.

PROJECTS COVERED

By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger: water supply, earthwork, waterways $53,000; other public works $88,000; Industrial buildings $110,000; other buildings $400,000. Also Foreign projects of $1,000,000 and more in size of Interest to American contractors.

By Regions & Classes of Construction

(In order of Listing)

BIDS ASKED
LOW BIDDERS
CONTRACTS AWARDED
New England
Middle Atlantic
South
Middle West
West of Mississippi
Far West

PROPOSED WORK
Water Supply
Sewers, Waste Disposal
Bridges
Streets & Roads
Earthwork, Waterways
Public Buildings
Mass Housing
Commercial Buildings
Industrial Buildings
Unclassified

In These Stages

PROPOSED WORK: Before and including appointment of engineers or architects.

BIDS ASKED: BA (new announcements only). For full calendar, see also preceding issues.

SOON LETS CONTRACT: SLC

LOW BIDDERS: LB On jobs below $500,000 in value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: CA Except awards to low bidders previously reported in low bidder stage.

CD dates shown are of Construction Daily Issue in which last previous report was published.

OWNERS, ENGINEERS, ARCHITECTS, CONTRACTORS are invited to report their new jobs for listing in these reports when they meet or exceed the size minimums shown above. Address these news releases to J. A. Mahoney, REPORTS, ENGINEERING NEWS-RECORD, 330 W. 42 St., New York 36, N. Y.

Symbols and Abbreviations Include:

†	Federal Government
▲	Project of $1,000,000 or over.
ENR	Engineering News-Record
CD	Construction Daily

For additional reports see Construction Daily.

J. F. White Contg. Co., P.O. Box 358, Westwood, Mass. CA **$632,000**, Contr. 1-U-58-6, COLD STORAGE LABORATORY, University of Massachusetts, AMHERST, MASS. Commonwealth of Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Feb. 5. CD 2/10, under LB.

▲ **Joseph Rugo, Inc.**, 115 Homes Ave., Dorchester, Mass., LB **$1,447,000**, est. $1,524,000, U-57 Contr. 2, SCIENCE BLDG., University of Massachusetts, AMHERST, MASS. Commonwealth of Mass., Dpt. Educ., c/o Div. Bldg. Constr., 38 Chauncy St., Boston, Mass. Bids Mar. 11. CD 2/16.

Louis McAloon, Woodbridge Rd., North Andover, Mass., CA Approx. **$400,000**, CONVENT addn., alterations, School St., ANDOVER, MASS. St. Augustine's R. C. Parish, Chancery Office, 1 Lake St., Brighton, Mass. Bids Mar. 2. CD 2/17.

D. & D. Constr. Co., Nashua Rd., North Billerica, Mass., CA Approx. **$120,000**, RESEARCH and DEVELOPMENT LABORATORY (1960 addn.), BILLERICA, MASS. Godfrey L. Cabot, Inc., 125 High St., Boston, Mass. Symmes, Maini & Hrylewicz, 604 Putnam Ave., Cambridge, Mass., archts.

Martin Cerel, 18 E. Central St., Natick, Mass., Owner Builds, approx. **$400,000** (third section) 22 HOUSES "Brentwood" off Rte. 3A, BURLINGTON, MASS.

▲ **Middlesex Homes, Inc.**, 1 Russell St., Woburn, Mass., Owner Builds, Approx. **$1,500,000**, Section 2C, 80 HOUSES, "Woodvale", Rte. 62, DANVERS, MASS.

Owner, c/o Murphy & Murphy Drive In-Real-Estate, Inc., Post Rd., Sudbury, Mass., Owner Builds, Approx. **$400,000**, 26 HOUSES "Maydale Manor", MAYNARD, MASS.

▲ **A. A. Will Corp.**, 1094 Blue Hill Ave., Milton, Mass., Separate contracts **$1,000,000**, INDUSTRIAL PARK, EASTON, MASS. CD 3/10.

Del Constr. Co., 5½ Hazel Park, Roxbury, Mass., CA **$240,000** WAREHOUSE, Central Ave., EASTON, MASS., Karal Constr. Co., 649 Wellesley St., Weston, Mass. CD 2/16.

Leonard Ruggo, Inc., 47 River St., Wellesley, Mass., LB **$861,000**, JUNIOR HIGH SCHOOL, High St., North Randolph, RANDOLPH, MASS. Town, Memorial High School, Memorial Dr., Randolph, Mass. Bids Mar. 9. CD 2/24.

▲ **H. P. Cummings Constr. Co.**, 14 Prospect St., Ware, Mass., LB **$1,107,333**, HIGH SCHOOL, Palmer Rd., WARE, MASS. Town, School Dpt., Town Hall, Ware, Mass. Bids Mar. 10. CD 2/16.

▲ **L & S Builders**, 154 Rockwell Ave., Bloomfield, Conn., Owner builds, **$1,567,500**, 55 HOUSES, Livingstone Rd., BLOOMFIELD, CONN. CD 10/23/58.

C. W. Blakeslee & Sons, Inc., 58 Waverly St., New Haven, Conn., Owner Builds, **$113,000**, CONCRETE MIX PLANT, 225 Pine Rock Ave., HAMDEN, CONN.

Hyman Smith, 238 Curtis Terrace, Fairfield, Conn., CA **$116,000**, MACHINE SHOP, Honeyspot Rd., STRATFORD, CONN. A. E. Erickson, Burr Court, Fairfield, Conn. Fred Gellert, 915 North Ave., Bridgeport, Conn., archt.-engr. Awarded Feb. 10.

MIDDLE ATLANTIC

† **Pa., Braddock**—BA 3/25—General Services Admin., 250 Hudson St., New York, Zone 13, N. Y., Proj. 00802-20 maneuvering expansion and driveway widening U. S. Post Office.

† **N. Y., St. Albans**—REPLACEMENT OBSTRUCTION LIGHT CABLE—BA 3/29—Area P. Wks. Office, N. Y., Rm. 633, Federal Office Bldg., 90 Church St., New York 7, replacement of obstruction light cable, U. S. Naval Hospital, NBy-26869, Spec. No. 26869/60. Under $10,000.

† **N. Y., St. Albans**—REPLACEMENT STEAM & CONDENSATE LINES (Servicing)—BA 3/31—Area P. Wks. Office, N. Y., Rm. 633, Federal Office Bldg., 90 Church St., New York, Zone 7, replacement steam and condensate lines (servicing) U.S. Naval Hospital, NBy 26758, Spec. No. 25759/59. Under $10,000.

N. Y., New York—BA 4/12—Bd. Water Supply, 13th Fl., 120 Wall St., New York 5, Contr. 458, furnishing, testing, delivering stainless steel Venturi meters with instrument assemblies and appurtenances complete in every respect and ready for installation all as set forth in specifications, one 143 in by 102 in. Venturi meter and one 24 in. by 18 in. Venturi meter will be required for the Release Water Works at the Cannonsville Dam and one 108 in. by 72 in. Venturi meter will be required for Outlet Works of the West Delaware Tunnel. Plans deposit $5. each. CD 1/27/50.

† **N. Y., Plattsburgh**—RUNWAY OVERRUNS, etc.—BA 4/12—U. S. Eng., 111 East 16th St., New York, Zone 3, runway overruns and approach lighting, Plattsburgh Air Force Base, ENG-30-075-60-66. $900,000. Plans deposit $5. CD 10/29.

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† **Md., Andrews Air Force Base**—WASHRACK, AIRCRAFT—BA About 4/20—U.S. Eng., 1st and Douglas Sts. N.W., Wash. 25, D. C., washrack, aircraft, ENG-49-080-60-47 (50). Plans deposit $5. Green Assoc., Inc., 220 E. Pleasant, Baltimore, Md., consult. engr. CD 12/23, under LB.

BUILDINGS—BA

† **N. J., Earle**—FENDER SYSTEM REPAIRS—BA 3/28—Area P. Wks. Office, Room 633, Federal Office Bldg., 90 Church St., New York 7, N. Y., repairs to fender sys., Piers and trestles, U. S. Naval Ammunition Depot, NBy 26810, Spec. No. 26810/59. $25,000-$100,000. CD 8/28/56.

▲ **Pa., Phila.**—MOTEL—BA 3/29—Crossway Motor Hotel, Inc., 19 Tarrytown Rd., Elmsford, N. Y., 95-unit motel, $1,000,000. Henry Moger, Jr., 250 Main St., White Plains, N. Y., archt.-engr. CD 12/28.

† **D. C., Wash.**—DORMITORY IMPRVS.—BA 3/31—P. Bldg. Service General Services Admin., General Services Bldg. 19th and F Sts., N. W., zone 25, men's dormitory and cafeteria and service bldg. landscape work, Gallaudet College, Florida Ave. and 6th St. N. E., Proj. No. 49239 and 49240 Contract No. GS-R3-B 7982. CD 11/9/56.

▲ **N. J., Basking Ridge**—HIGH SCHOOL—BA 4/5—Bd. Educ. Bernards Twp., high school, $1,532,000. Micklewright & Mountford, E. Stuyvesant, Trenton, archts. CD 10/14.

N. Y., New York—FIREHOUSE—BA 4/6—Dpt. P. Wks., Rm. 2200, Municipal Bldg., New York 7, general contract, plumbing work, heating and ventilating, electrical work firehouse for Engine 59, Ladder 30 and Squad Unit No. 1, north side of W. 133d St. between 7th and Lenox Aves., Manhattan Boro. Plans deposit $20. CD 1/25.

▲ **Del., Newark**—RESIDENCE HALLS—BA 4/15—University of Delaware, 5 residence halls and dining hall, $2,000,000. Howell, Lewis, Shay & Assocs., Packard Bldg., Phila., Pa., archts. Keast & Hood, 1201 Chestnut St., Phila., Pa., engrs. CD 12/17.

N. J., Camden—PIPE STORAGE, etc.—Bids Asked—New York Shipbuilding Corp., Broadway and Fairview Sts., Zone 1, 70x200 ft. steel pipe storage, furnishing and erecting 5 ton crane.

BUILDINGS—SLC

Md., Bladensburg—BOWLING ALLEY—Owner, c/o Weber, Jacobs & Kelly, 505 N. Utah St., Baltimore, and Edwin Ball, 5817 Baltimore Ave., Riverdale, archts., soon lets contract bowling alley, Defense Hy. and Cooper Lane. CD 3/4.

HEAVY CONSTRUCTION—LB & CA

▲ **Bates & Rogers Constr. Corp.**, 600 W. Jackson St., Chicago, Ill., CA **$1,926,871**, Sched. 1, (power authority supplying aggregate) South Approach road 5.5 mi., Lewiston Rd. 6.5 mi. from Devils Hole Park to Niagara Power Plant, Contr. N-26, NEW YORK. Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York 19, N. Y. Bids Feb. 18. CD 2/29 under LB.

† **Grow Constr. Corp.**, 313 W. 53 St., New York 9, N. Y., LB **$489,000** (1 bidder), dewatering conduit, Dry Dock No. 2, New York Naval Shipyard, NBy-26857, Spec. No. 26857/60, BROOKLYN. N. Y. Area P. Wks. Office, New York, Rm. 623, Federal Office Bldg., 90 Church St., New York 7, N. Y. Bids Mar. 10. CD 2/19.

▲ **Ralph Tomasetti & Co.**, 1163 58th St., Brooklyn 19, N. Y., LB **$2,026,029**, (6 bidders), combined relief sewers in 17th Ave. from 50th St. to Dahill Rd., in Dahill Rd. from Cortelyou Rd. to Avenue F, and in 42nd St. from 17th Ave. to Dahill Rd., combined sewer in 39th St. from 16th Ave. to Dahill Rd. and high level combined lateral sewers in southwest side of 17th Ave. from 50th St. to 42nd St. in northeast side of 17th Ave. from 50th St. to point about 20 ft. north of 49th St.; from 48th St. to 46th St. from 45th St. to point about 125 ft. northeasterly and from 44th St. to 42nd St. in westerly side of Dahill Rd. from 17th Ave. to 38th St. and in easterly side of Dahill Rd. from Avenue F to Cortelyou Rd., Brooklyn Boro, BROOKLYN, N. Y. President Brooklyn Boro, Rm. 21, Boro Hall, Brooklyn 1, N. Y. Bids Mar. 11. CD 3/3.

† **Radory Constr. Corp.**, 94 Cherry Valley Rd., West Hempstead, N. Y., CA **$236,822**, constr. roads, water supply lines and drainage facilities at Long Island National Cemetery, western Suffolk Co., 3 mi. east of Farmingdale, ENG-30-075-60-82, FARMINGDALE, N. Y. U. S. Eng., 111 East 16th St., New York 13, N. Y. Bids Feb. 16. CD 1/11.

▲ **Tufano Contg. Corp.**, 32-17 Laurence St., Flushing, N. Y., LB **$1,598,760**, (7 bidders), rehabilitation Runway 4-22 and associated taxiways, paving and utilities, LaGuardia Airport, Contr. LGA-310.009, JACKSON HEIGHTS, N. Y. Port of New York Authority, 111 8th Ave., New York 11, N. Y. Bids Mar. 10. CD 3/10.

NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton, Bids opened 3/10,

Hess Brothers, Inc., Deerfield Rd., Parlin, N. J., LB **$897,467**, (15 bidders), cloverleaf interchange on U.S. Rte. 1 at Milltown Rd. and imprv. 1.2 mi. U.S. Rte. 1 from Rte. 130 to College Farm Rd., North Brunswick Twp., Middlesex Co. CD 2/23.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, Bids opened 3/11,

Pa.—**Herman W. Riebe**, t/a Charles Riebe, 333 Columbia Ave., Palmerton, Pa., LB **$132,373**, (13 bidders), resurf. 24,025 ft. existing highway with bit. surf. variable in width T.R. 222, Upper Macungie Twp., Lehigh Co., LB **$161,840** (11 bidders), resurf. 39,000 ft. existing highway with bit. surf. variable in width

(Continued on page 274)

How Howard W. Thomas Corporation licked the problem of operator inexperience

and boosted production 77%

Like you're doing right now, Mr. Howard Thomas of East Bradenton, Florida, was reading a job story. A job story which told, among other things, how Michigan Tractor Scrapers packed in more pay yards than comparable machines. Also, how their all-Clark power trains, with power shift transmission and torque converter, were producing higher average haul speeds.

Sounded worth checking, thought contractor Thomas. He did—and the result was the purchase of not only a 262 hp, 19 yard Model 210 Scraper, but also a matching (same power, same basic power train) Model 280 Michigan *Tractor Dozer!*

The story of course doesn't end here. The next step was a series of jobs, ranging from the 60,000 yd state road subcontract pictured to a 700,000 yd housing project. Then, one day, a leading competitor of ours brought in a set of platform scales.

What they found sent them away shaking their heads.

For, the Michigan Model 210, weighed and timed over a lengthy period of time, had moved 77% *more dirt per day than its rivals!*

1/3 more pay yds per load

Weight studies showed a 33% advantage. Michigan loads in typical Florida sand *averaged 14 pay yds.* Self-propelled Scrapers "A" and "B," with heaped capacities of 17 yds (compared to the Michigan's 19), each *averaged 10½ pay yds.* Same material, same cut, same pusher (the Michigan 280), *same load time* for all scrapers.

1/3 more trips per hour

Haul studies showed a similar advantage. Traveling over a hilly, winding mile-long round trip, the Michigan made 10 cycles per hour. The other two scrapers each made 7 cycles per hour. Higher top speed (31.4 mph)—plus the exceptional time-saving advantages of power-shift transmission and torque converter—accounted for the difference.

$4.50 per hour profit drain also eliminated

Track replacement alone on his 40,000 lb crawler-pusher used to cost Thomas an average of $4.50 per hour. Downtime was high too: every 500 to 600 hours, the crawler had to be pulled off the job and some 12 man-days invested in a track overhaul. Costly, to say the least.

Today, no more problem! Bigger, more powerful, faster on both pushing and dozing, the 50,000 lb Michigan regularly heap-loads 14 pay yds of sand in 30 to 60 seconds. Tires, now at the 2500 hour mark, still have almost all tread, are expected by company officials to last about three more years.

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CLARK EQUIPMENT

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CIRCLE 273 ON READER SERVICE CARD

(Continued from page 272)

T.R. 309-29 N. Whitehall and Heidelberg Twps., Lehigh Co.;

Pa.—**Fred W. Ewing, Inc.**, 405 W. Main St., Corry, Pa., LB **$588,352**, (7 bidders), 24,620 ft. cr. aggregate base highway with bit. surf. 20 ft. wide, alternate superstructure Bridge L.R. 4210-(4) Bradford Twp., McKean Co., LB **$309,940**, (7 bidders), 13,737 ft. cr. aggregate base highway with bit. surf. 20 wide, 1 bridge L.R. 43120 (1) Pymatuning and Delaware Twps., Mercer Co.;

Pa.—**Bracken Constr. Co.**, Sligo, Pa., LB **$402,822**, (8 bidders), widening 23,718 ft. existing highway with cr. aggregate variable in width, and bit. surf. 22 ft. wide 1 bridge, T.R. 156, Kiskiminetas and S. Bend Twps., Armstrong Co.;

Pa.—**Mayer Bros. Constr. Co.**, 1227 W. 18 St., Erie, Pa., LB **$131,651**, (4 bidders), resurf. 24,620 ft. existing highway with bit. surf. 24 ft. wide T.R. 5, Harborcreek Twp., Erie Co.;

Pa.—**Middlecreek Constr. Co.**, Winfield, Pa., LB **$306,043**, (10 bidders), 17,807 ft. cr. aggregate base highway with bit. surf. 20 ft. wide, L.R. 49012 (7) East Cameron Twp., Northumberland Co.;

Pa.—**Stabler Constr. Co.**, 635 Lucknow Lane, Harrisburg, Pa., LB **$130,786**, (11 bidders), resurf. 34,840 ft. existing highway bit. surf. variable in width, T.R. 611 Williams Twp., Northampton C.;

Pa.—**Bertocci Constr. Co.**, R. D. 1, Venetia, Pa., LB **$134,460**, (12 bidders), 8,430 ft. cr. aggregate base highway with bit. surf. 18 ft. wide L.R. 62209 (1) Roscoe, Allenport and Long Branch Boros, Washington Co.;

Pa.—**A. E. Oblock**, Unity, Pittsburgh 35, Pa., LB **$989,260**, (6 bidders), 34,253 ft. cr. aggregate base highway with bit. surf. 18 ft. wide, 2 bridges, T.R. 949, Ridgway and Spring Creek Twps., Elk Co.;

Pa.—**J. D. Eckman, Inc.**, Box 176, Atglen, Pa., LB **$105,476**, (6 bidders), 4,950 ft. cr. aggregate base highway with bit. surf. 18 ft. wide, 1 alternate superstructure bridge, L.R. 36009 (5) Little Britain and Colerian Twps., Lancaster Co. CD 2/12.

E. Allen Reeves, Inc., 1145 York Rd., Abington, Pa., LB **$299,800**, general contract park development, ABINGTON, PA. Abington Twp. Comn., Abington, Pa. Bids Mar. 7. CD 2/25.

James D. Morrissey, Inc., 9119 Frankford Ave., Phila., Pa., LB **$300,389**, Bids 3699-3704, paving, PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. Bids Mar. 10. CD 2/25;
Broadway Maintenance Co., 2300 N. Sydenham St., Phila., Pa., LB **$120,421**, Bid 3712, paving (Phila., Pa.);
Eastern Asphalt Co., No. 2 Penn Center Plaza, Phila., Pa., LB **$104,143**, Bids 3700, 3701, 3702 and 3703, paving (Phila., Pa.);
General Asphalt Paving Co., 6851 Rising Sun Ave., Phila., Pa., LB **$101,096**, Bids 3705 and 3706, paving (Phila., Pa.).

Helmark Constr. Co., O and Cayuga Sts., Phila., Pa., LB **$184,995**, Bid 2502, water mains, PHILA., PA. Dpt. Procurement, City Hall Annex, Phila., Pa. Samuel S. Baxter, water comr. Bids Mar. 8. CD 2/25.

▲ **MARYLAND**—State Rds. Comn., 300 W. Preston St., Baltimore, Zone 3,
A. H. Smith, Branchville, Md. and **Williams Paving Co.**, 1269 E. Prince Ann Rd., Norfolk, Va., CA **$1,672,520**, grading, drainage, paving 6.49 mi. Washington Circumferential Hy., incl. 3 ramp interchanges and connecting roads near Washington, D. C., M 512-5-320 and M-531-16-320, Montgomery Co. Bids Jan. 26. CD 1/29, under LB.

MARYLAND—State Rds. Comn., 300 W. Preston St., Baltimore, Zone 3, Bids opened 3/8,
McGuire & Rolfe, Inc., Lexington Park, Md., LB **$88,456** (2 bidders), grading, paving, surf. 4.557 mi. section John Hansen Hy. near Washington, D. C. P-391-22-320, Prince George Co. CD 2/23.

Paramount Constr. Co., 7614 Holabird Ave., Baltimore 22, Md., LB **$136,224**, Hy. Contr. 1558 C.C. cement concrete paving, BALTIMORE, MD. City, Bureau Hys., 303 Municipal Bldg., Baltimore 2, Md. Bids Mar. 9. CD 1/18/50.

Baylor Constr. Co., 360 Lexington Ave., New York, N. Y., CA **$916,730**, Contr. S-2, sewage treatment plant, ELKTON, MD. Pres. and Comrs. Town of Elkton, Elkton, Md. Bids Jan. 5. CD 1/13, under LB.

Ligon & Ligon, 3310 Ridgewood Ave., Baltimore 15, Md., LB **$58,507**, (7 bidders), Contr. 701-W, water main extension, 5th Dist., TOWSON, MD. Baltimore County Executive, County Office Bldg., Towson 4, Md. Bids Mar. 3. CD 2/17.

McCarthy Constr. Co., 6th and Harriet St., Cincinnati, O., LB **$685,199**, (8 bidders), Southeast Relief Watermain, First Section N. St., between First St. N.W. and 3 St. N.E., between M and N Sts., WASH., D.C. D.C. Govt., Dpt. Sanitary Engineering, 499 Pa. Ave. N.W., Wash., D.C. Bids Mar. 10. CD 2/16.

† **American Dredging Co.**, 12 S. 12 St., Phila., Pa., LB **$179,340**, maintenance dredging Wilmington Harbor, No. 36-109-60-42, DELAWARE. U. S. Eng., 2635 Abbottsford Rd., Phila., Pa. Bids Mar. 3. CD 2/18.

† **Base Procurement Office**, Dover Air Force Base, Dover, Del., cancelled bids to have been opened Feb. 2, rehabilitation Bldg. 328, Dover Air Force Base, IFB-07-603-60-42, DOVER, DEL. CD 1/20.

BUILDINGS—LB & CA

Lange-Finn Constr. Co., Inc., 522 Broadway, Albany, N. Y., LB **$853,000**, general contract South End ELEMENTARY SCHOOL, S. Pearl, Rensselaer, Schuyler and Franklin Sts., ALBANY, N. Y. Bd. Educ., 141 Western Ave., Albany, N. Y. CD 5/14.

▲ **F. D. Rich Co., Inc.**, 550 Summer St., Stamford, Conn., LB **$2,433,798**, (14 bidders), construction BUILDING 9, Department of Taxation and Finance, State Office Bldg., Campus Site, ALBANY, N. Y. Henry A. Cohen, dir. Bureau Contracts, State Office Bldg., Albany, N. Y. Bids Mar. 9. CD 1/29;
E. W. Tompkins Co., Inc., 158 Orange St., Albany, N. Y., LB **$814,312** (11 bidders), heating work Building No. 9 (Albany, N. Y.);
Keystone Engineering Corp., 448 W. 12 St., Phila., Pa., LB **$421,000** (10 bidders), electrical work Building 9 (Albany, N. Y.).

Michael Constr. Co., 135-20 39th Ave., Flushing 54, N. Y., CA Est. **$150,000**, 1 story GROCERY WAREHOUSE and OFFICE addn., 593-665 E. 56th St., BROOKLYN, N. Y. Key Food Stores, Co-op. Inc., 665 E. 58th St., Brooklyn 3, N. Y. CD 12/14.

1550 Shore Parkway Corp., 2057 Flatbush Ave., Brooklyn 10, N. Y., Owner Builds, **$850,000**, 6 story APARTMENT, incl. 31-car garage, 1516 Voorhies Ave., BROOKLYN, N. Y. Samuel Gardstein & Son, 76 Court St., Brooklyn 2, N. Y., archts. CD 5/28.

▲ **Emil Muller Constr. Co.**, 70 South Ave., Rochester, N. Y., CA Est. over **$2,000,000**, twenty-eight 2 story APARTMENTS, GREECE (BR. ROCHESTER), N. Y. Northgate Manor Inc., c/o Renar Designs, Inc., archts., 68 South Ave., Rochester, N. Y.

Swartout & Rowley, Inc., 548 Mt. Hope Ave., Rochester, N. Y., LB **$788,742**, general contract, 83,000 sq. ft. JUNIOR HIGH SCHOOL, Lehigh Station Rd., Rush, HENRIETTA N. Y. Bd. Educ. Central School Dist. No. 1, 4000 East Henrietta Rd., Henrietta, N. Y. Bids Mar. 8. CD 2/25.

▲ **174-176 East 71st St. Corp.**, 120 Broadway, New York 7, N. Y., Owner Builds, **$2,000,000**, 20 story APARTMENT, 174-178 E. 71st St. and 1218-28 Third Ave., NEW YORK, N. Y. Paul Resnick & Harry Green, 654 Madison Ave., New York 21, N. Y., archts. CD 9/21.

▲ **330 E. 49th St. Corp.**, 40-37 77th St., Elmhurst, N. Y., Owner Builds, **$1,200,000**, APARTMENT, 326-36 E. 49th St., NEW YORK, N. Y. Paul Resnick, 654 Madison Ave., New York 21, N. Y., archt. CD 5/14.

▲ **Valeray Real Estate Co.**, 14 E. 47th St., New York 17, N. Y. Separate Contracts, **$1,900,000**, APARTMENT, 175-179 E. 82nd St., 1450-1466 3rd Ave. and 168-74 E. 83rd St., NEW YORK, N. Y. Paul Resnick, 654 Madison Ave., New York 21, N. Y., archt. CD 10/17/58.

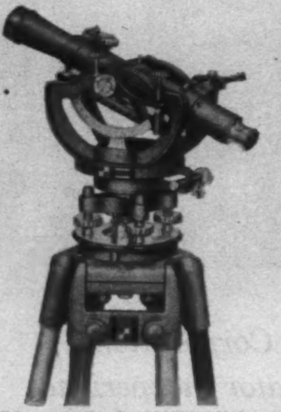
▲ **James King & Son, Inc.**, 350 Fifth Ave., New York 1, N. Y., CA Est. **$2,000,000**, FRIARY, OLEAN, N. Y. St. Bonaventure University, Olean, N. Y. Brother Cajetan Baumann, 44 Whitehall St., New York 4, N. Y., archt. Bids Feb. 18. CD 2/11.

† **Hambly Constr. Co. Inc.**, 10 Ford Ave., Oneonta, N. Y., CA **$158,900**, REACTOR CELL, Bldg. E-5 (Phase II), Knolls Atomic Power Laboratory, Inv. No. AE-60-SCH-380, WEST MILTON, N. Y. Atomic

(Continued on page 276)

after your first-order survey...

take rugged, reliable
DAVID WHITE
SURVEYING
INSTRUMENTS
into the FIELD!

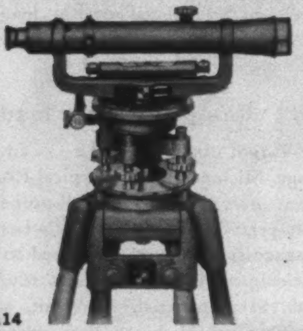


T8300
More builders use the David White Universal than any other transit! Soon pays for itself in aligning piers, plumbing walls and uprights, general highway construction, obtaining angles and checking every stage of construction from the ground up. The T8300 Universal stays on the job, assures unfailing accuracy. With tripod $222.50

for day-to-day instrumentation
for specification checks

SENSITIVE AND ACCURATE
12-inch telescopes — 26x magnification — internal rack-and-pinion focusing — coated optics — machine divided graduations on all circles and verniers — 120-second level vial — accurate readings to 5 minutes — rolled threads on all clamp and tangent screws — wide, flat field of view — torque-free, European-type aluminum tripod.

RUGGED
Permanently lubricated double ball bearing race center — heavy zinc alloy, one-piece standards — covered leveling screws.



T8114
Builders and contractors find this 12-inch level indispensable for measuring elevations, laying out foundations, running lines, and grading. Used by more builders than any other level. With tripod $173.50

Prices may be slightly higher west of the Rockies.

DAVID WHITE
INSTRUMENTS
A Division of Realist, Inc. Menomonee Falls, Wisconsin

The season's most unusual job

Geo. M. Brewster & Son, Inc solution includes use of one Dozer, this big 375 hp Michigan, to spread 25,000 yds daily on 3 fills

How would you handle a job where the state-specified borrow pit was on an island and the main fill was across 400 ft of river water . . . and where there were no bridges in between?

This was the puzzling problem faced by bidders on a 1,400,000 yd, 4 mile section of Route 129 Freeway near Trenton, New Jersey.

Would you dredge? Or build trestles? Or use barges? Or what?

Flood danger makes speed essential

The successful bidder in this case had a different solution. Geo. M. Brewster & Son, Inc, well-known Bogota, N. J. contractor, placed their bid, roughly $4,500,000, on a gamble. They would dam the inside channel of the river on its upstream side, let the water drain, then build several inexpensive earth causeways to the mainland fill area. The question was, "Could they move the necessary dirt quickly enough to avoid high water?" For this river, the Delaware, has been known to rise at least 15 feet above its present normal stage.

Fast mobile equipment and two 10-hour shifts per day were the basic choice. Yet for economy reasons a relatively small fleet did all work. A tractor-pulled and pushed belt-loader did the loading. Ten 16-yd bottom-dumps moved the fill. One machine—a high-speed 375 hp Michigan Model 380 Tractor Dozer—handled *all* spreading.

Michigan replaces 2 or 3 crawlers

Brewster figures that because of its 25 mph speed and its power, the big Michigan replaced two or three large crawler dozers. *Working alone, it easily handled three separate dumping areas,* spreading 25,000 yds of soft silty sand per 20 hour day.

Thus dirtmoving was completed long before flood season. Use of the big Michigan had cut costs in some extremely important ways. One, it alone did the work of several big crawler-dozers. Two, it completely eliminated track maintenance and repairs, which in sand like this, could total $10 per hour, or more! Three, it proved versatile enough to spread gravel sub-base as well as sand fill, handle emergency truck towing, and do much of the compaction on all 3 fills.

Michigan job-proved Tractor Dozers could do the same for you! Pick the size to fit *your job*—162, 262, 375 or 600 *hp*—then call your Michigan Distributor for a demonstration. You name the time and place.

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK EQUIPMENT

2401 Pipestone Road
Benton Harbor 16, Michigan

In Canada:
Canadian Clark Ltd.
St. Thomas, Ontario

CIRCLE 275 ON READER SERVICE CARD

MOTION
SOLE PLATE
LUBRITED SURFACE
LUBRITE PLATE
BASE PLATE
MOTION
DEFLECTION
SOLE PLATE
LUBRITED SURFACES
LUBRITE RADIALUBE PLATE
BASE PLATE
MOTION
DEFLECTION
LUBRITE TREPANNED BUSHING
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Lubrite®
Self Lubricating
EXPANSION PLATES & BUSHINGS

- Permit simplified designs
- Cut construction costs
- Eliminate maintenance
- Low coefficient of friction

Lubrite offers positive assurance of self lubricating security in all installations where expansion, contraction and/or rotation are factors.

3 BASIC LUBRITE ASSEMBLIES FROM MANY AVAILABLE

SEND FOR THIS IMPORTANT AND VALUABLE LITERATURE —
Manual No. 55 contains complete information, technical data and specifications about Lubrite Expansion Plates and Bushings for bridges, buildings, refineries, atomic energy and chemical processing equipment applications.

Manual No. 56 covers Lubrite bushings, bearings and washers for use in machinery, industrial equipment, hydro-electric projects, missile and atomic energy and high temperature applications.

LUBRITE DIVISION
MERRIMAN BROS., INC.
191 Amory Street, Boston 30, Mass.

(Continued from page 274)

Energy Comn., Schenectady Naval Reactors Operations Office, P.O. Box 1069, Schenectady, N. Y. Bids Feb. 2. CD 1/13.

▲ **Double-M Constr. Co.**, 1776 Broadway, New York, N. Y., [illegible] $2,195,400, general contract HIGH SCHOOL, NORTH [illegible]ERGEN, N. J., Bd. Educ., North Bergen, N. J. Bids Feb. 20. CD 1/27.

Allstate Constr. Co., Broad and Alward Rds., Clifton, N. J., CA $850,000, 100,000 sq. ft. Grand Union STORE, Rte. 46, ROCKAWAY, N. J. Philip J. Levin, U. S. Hy. 22, North Plainfield, N. J. Harold Glucksman, 850 Broad St., Newark, N. J., archt.

▲ **Joseph A. Sweeney**, 257 E. Main St., Somerville, N. J., Owner Builds, $3,000,000, 100 HOUSES, Martine Ave. and Lamberts Mill Rd., SCOTCH PLAINS, N. J.

▲ **Krugman & De Petro**, 1330 Main Ave., Clifton, N. J., Owner Builds, $1,000,000, 33 HOUSES, Burlington Ave., TOTOWA, N. J.

Harry Pearl, 5200 Overbrook Ave., Phila., Pa., Separate Contracts, Over $400,000, RESIDENTIAL DEVELOPMENT, vicinity Montgomery Ave., BALA CYNWYD, PA.

Gamble & Gamble Constr. Co., P. O. Box 57, Bolivar, Pa., LB $646,000, (14 bidders), general constr. SCHOOL for Laurel Valley Joint School Bd., Proj. 725-604 BOLIVAR, PA., Pa. Public School Bldg. Auth., 101 S. 25 St., Harrisburg, Pa., Bids Mar. 10. CD 2/3.

William C. Pickett & Co., 237 Long Lane, Upper Darby, Pa., CA $450,000, RESIDENTIAL DEVELOPMENT, Sproul Rd., etc., BROOMALL, PA. Realty Management Corp., Newtown Square, Pa.

Joseph R. Farrell, Inc., West Conshohocken, Pa., LB $579,568, HEADQUARTERS OFFICE BLDG., BRYN MAWR, PA. American College of Life Underwriters, 3924 Walnut St., Phila., Pa. CD 11/17.

D. Pileggi & Sons, 317 W. 3 St., Chester, Pa., CA $110,000, WAREHOUSE, SHOWROOM, OFFICE BLDG., CHESTER, PA. Wolf Paper Co., 219 Edgemont Ave., Chester, Pa. CD 2/4.

W. F. Poole Constr. Co., Lima, Pa., Separate Contracts, $400,000, RESIDENTIAL DEVELOPMENT, 25 homes, Indian Lane Rd., etc., LIMA, PA.

James Turzo, Feasterville, Pa., LB $438,000, general contract M. R. Reiter Elementary SCHOOL, MORRISVILLE, P. Morrisville School Auth., Morrisville, Pa. Bids Mar. 9. CD 3/1.

James Turzo & Son, 126 Skyline Ave., Feasterville, Pa., LB $438,000, (9 bidders), general construction remodeling high school into ELEMENTARY SCHOOL, MORRISVILLE, PA. Morrisville Bd. Educ., Summerseat, Morrisville, Pa. Bids Mar. 9. CD 3/2.

▲ **Turner Constr. Co.**, 1500 Walnut St., Phila., Pa., CA $1,200,000, HOSPITAL addn., PHILA., PA. Jeanes Hospital, Hasbrouck Ave. and Hartel St., Phila., Pa. Smith & Thaete, 1601 Chestnut St., Phila., Pa., archts. Robert McLaughlin, 1411 Walnut St., Phila., Pa., engrs. CD 3/22/56.

Leonard Shaffer Co., 207 S. 24 St., Phila., Pa., and **Arthur A. Kober Co.**, Bala Cynwyd, Pa., CA $500,000, CLUB, PHILA., PA. Locust & Midcity Club, 1612 Locust St., Phila., Pa. Julius Dorfman, 1518 Walnut St., Phila., Pa., engr. CD 10/16.

William H. Berber, Ambler, Pa., CA $150,000, WAREHOUSE and OFFICE, SOUTHAMPTON, PA. Benjamin Metz, 710 Medary Ave., Phila., Pa. Hassinger & Schwam, 27 Maplewood Ave., Phila., Pa., archts.

▲ **General State Auth.**, 18th and Herr Sts., Harrisburg, Pa., rejected bids Mar. 9, EDUCATION and PSYCHOLOGY CENTER and buildings for research in horticulture, 2 greenhouses, 1 field service house, UNIVERSITY PARK, PA. $2,000,000. Will re-advertise. CD 2/3.

E. Eyring & Sons Co., 808 S. Conkling St., Baltimore 24, Md., CA $495,000 brick, concrete, steel, steel joists, block, etc. CHURCH & RECTORY, RIVIERA BEACH (R. STA. PASADENA), MD. St. Jane Frances De Chantel Parish, Riviera Beach, Md. Edward Q. Rogers, 306 N. Charles St., Baltimore 1, Md., archt.

▲† **McCloskey & Co.**, 1620 W. Thompson, Phila., Pa., CA $50,793,000, superstructure for additional OFFICE BLDG. for U. S. House of Representatives, WASH., D. C. Office of the Architect of the Capitol, U. S. Capitol, Wash., D. C. Bids Feb. 18. CD 2/23, under LB.

Allen C. Minnix & Son, 216 C St. N.W., Wash., D. C., LB $585,099 (6 bidders), RESTAURANT, office and garage, Wisconsin Ave. and O St. N.W., WASH., D. C. Avignone Freres, 1777 Columbia Rd. N.W., Wash. D. C. Bids Mar. 7. CD 2/17.

▲ **Joseph Nebel Co.**, 3408 Wisconsin Ave. N.W., Wash., LB $2,455,000 (11 bidders), parking and OFFICE, Stage No. 4, WASH., D. C. National Education Assocs., 1201 16th St. N.W., Wash., D. C. Bids March 10. CD 2/17.

▲ **Wilmington Bd. Educ.**, 511 W 8 St., Wilmington, Del., contract cancelled Ninth Ward Elementary SCHOOL, Eighteenth and West Sts., WILMINGTON, DEL. Will re-advertise. CD 2/26, under CA.

SOUTH

HEAVY CONSTRUCTION—BA

Ga., Fort Valley—BA 3/29—City, City Hall, 13,000 lin. ft. 12-36 in. storm sewers, $100,000. Plans deposit $30. Wiedeman & Singleton, P.O. Box 1878, Atlanta, Zone 1, engrs. CD 12/30.

N. C., Raleigh—BA 3/29—City, City Hall, street imprvs. $600,000. Plans deposit $15. Vernon C. Peebles, Memorial Auditorium, city engr. CD 8/17.

(Continued on page 280)

"Unique" solution provided by rubber-tired Tractor Shovel on $6-million earth-rock job

Michigan handles swing shovel, dragline, and crawler-dozer work—as well as customary truck-loading

List & Clark Construction Company, of Kansas City, Missouri, has turned up what they consider a "unique" solution to an integral part of a $6-million earth and rock moving problem. They are applying a rubber-tired 4½ yd Michigan Model 275A Tractor Shovel to tasks formerly handled by rock-loading 2½ yd swing shovels, a 2½ yd dragline, and a crawler dozer.

The job is List & Clark's 12,000,000 yd Stage III contract on the $90-million Tuttle Creek Dam Project near Manhattan, Kansas.

Michigan loads 4,000 yds of shot rock per day

"Basically, we bought the Michigan to truck-load fine-grain sandy silt and clay," explains Mr. J. M. Clark, List & Clark vice-president. "However, the Tractor Shovel arrived just when a big push was underway and we put it to work loading shot limestone in the spillway channel. Production was so good, 4,000 yds per day, the Michigan replaced a 2½ yd swing shovel.

"As crushed stone stockpiles grew, the 262 hp Michigan took on the chore of loading 15,000 yds of blanket stone material previously handled with another 2½ yd swing shovel."

262 hp Tractor Shovel replaces dragline

"The rubber-tired Michigan was our solution to heavy track wear encountered on still another job," says Mr. Clark . . . "loading out the sandy silt placed on the river bank by dredge and surge pipe."

Maneuverability—key factor

The Michigan was also used *as a dozer* in the hydraulic discharge. This dozing of solid material mixed with water required rapid changes in machine direction to get the maximum of solids before water washed them away.

Resale value—tops

"When purchasing a machine of this size, there are a lot of things to consider," says Mr. Clark. "We found that resale and/or trade-in value of Michigans were unusually high. (*Actual figures show that after four years' use, many Michigan Tractor Shovels have returned 80% of their original purchase price.*) Knowing that our investment was thus so well protected—and looking at *all* the other facts—our decision to buy a Michigan was easy."

No-obligation demonstration

Perhaps *you* could use Michigan Tractor Shovel versatility and capacity. Choose from nine models—16 cu ft to 6 cu yds, 3,000 to 30,000 lb lift capacities. Call us . . . we'll be glad to demonstrate any of them.

Michigan is a registered trademark of

CLARK EQUIPMENT COMPANY

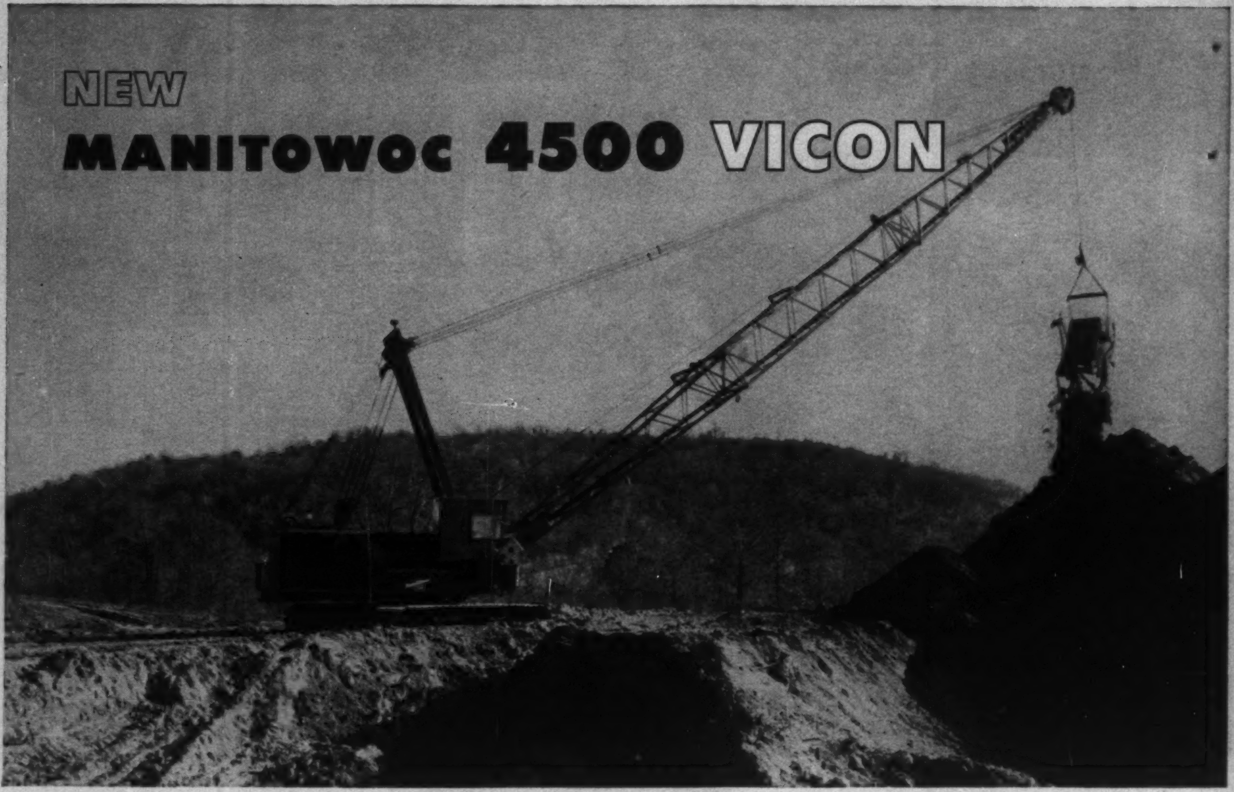
Construction Machinery Division

CLARK EQUIPMENT

2401 Pipestone Road
Benton Harbor 17, Michigan

In Canada:
Canadian Clark, Ltd.
St. Thomas, Ontario

CIRCLE 277 ON READER SERVICE CARD



A MAJOR ENGINEERING BREAK-THROUGH IN EXCAVATOR DESIGN

You get up to 25% more output with "integrated" controls, the "VICON" system of power application and control, and the new "interlock" drum arrangement

The Manitowoc 4500 Vicon is a 6 yard shovel or 7 yard dragline, incorporating an entirely new concept of excavator design and performance. Over 3 years of on-the-job-experience has proved its soundness of design, greater ease of operation; much faster operating cycles; greatly reduced maintenance costs; and far greater output from both shovels and draglines.

"Integrated" Controls Simplify Operation, Clutch Slippage Eliminated

Operating the Vicon is like flying . . . Cycle phases are that smooth, that "integrated"! Even green hands get results because it takes 50% less operator movement to run the machine.

Conventional engine throttles have been eliminated. Each clutch control lever in the high visibility Vicon pilot house is *also* a throttle! Engaging a swing or drum clutch, for instance, involves simply pushing (or pulling) the clutch control lever from dead center (stop) position. The further the lever is moved in the natural direction of the machine's movement the faster and harder it works in that direction.

There is no slippage when clutches are engaged because the first 10° of control lever movement does not activate the throttle—therefore, clutch engagement is effected at low engine R.P.M. and almost zero clutch and drum R.P.M. By *continuing* to move the clutch control lever, which is also the throttle, the machinery is accelerated via fast, smooth, three stage torque converter against the load . . . without *any* clutch slippage.

No Brakes Needed To Stop The Swinging Action

In conventional excavators it is normal to apply considerable "braking" effort to halt the "swing" of the machine so that it can be started in the opposite direction. *Before* "Vicon" it was necessary for the opposite clutch or swing brake to take this thrust (the disadvantages of excessive friction heat and wear are obvious). With Vicon the machine stops swinging one way and very smoothly accelerates in the opposite direction because the torque converter acts like a brake, absorbs directional thrust, eliminates shock and slip on the swing frictions and then provides instant acceleration for the return swing.

Engine Application Has Great Versatility

"Vicon" is two engine power applied in a way never before used for power shovels and draglines . . . and with boundless advantages in performance, maintenance characteristics, and production! One engine provides the power for swing and travel while the other powers the drums . . . allowing you to perform several functions simultaneously, in a smooth blending of cycle phases that provide operating speeds beyond the capabilities of conventional excavators.

Vicon design gives you faster, smoother clutch engagement with drastic improvements on the conventional problem of wear, heat and fade . . . yet you maintain top working speeds.

With the Vicon power application, certain operating advantages are immediately obvious . . . For instance, one engine may be slowed down to accommodate an extremely tough phase of the cycle without jeopardizing the ability of the other engine to immediately take over the following phase of the working cycle. Or, one engine may complete its assignment at a relatively high speed while the power of the other is introduced at idling R.P.M. to take over the next phase of the work. Valuable production time is not lost because of engine "lug down". On the other hand, clutches are not jammed into engagement at high and harmful engine speeds . . . The result, a smoother, faster, more economical operation with greater output, longer machine life, better all-around performance.

"Interlock" Reduces Brake Use By 50%

Vicon operation is so smooth that the machine seems to loaf on the job. Yardage totals, however, tell the true story. For instance, on the Vicon dragline you get the new "interlock" drum arrangement which suspends the dragline bucket in the middle of an endless line . . . cuts brake use up to 50% and you take advantage of full horsepower on the hoist (instead of burning it up on the brakes).

Vicon Has Doubled Drum Brake Capacity

You get higher speed dragline cycles than were ever before possible—and designed into this new Vicon component is another innovation included specifically to give pin-point control and increase production.

Both outside flanges of both the front and rear drums of the Vicon serve as big, fast acting efficient braking surfaces. The advantages are readily apparent on various stripping locations where the operators take pride in maintaining such pin-point casting control that they actually trim and maintain vertical side walls. It is common, for instance, to see a Vicon operator taking advantage of Vicon "Interlock" making high speed casts with the bucket held in a vertical position (teeth down). The bucket rushes out at full speed, is stopped smoothly over the top of the cut and then allowed to drop vertically to trim the wall. Vicon dragline drum "interlock" and drum brakes are in a class by themselves. Production gains are assured!

Other Innovations Are Yours With Vicon

For instance, a big universal radiator system gives you double the cooling capacity. Advantages of the Vicon cooling system are never more obvious than in prolonged travel with the Vicon maneuvering easily from one job location to the other. Travel, a situation embodying the most serious over-heating possibilities for the conventional machine, is no problem for the Vicon . . . which simply utilizes two engine cooling capacity for the operation of a single power system.

Shovel Has Less Weight—More Power On "Business End"

The Vicon shovel has all the advantages of the big, tough Model 4500 tubular style dipper stick and having separate hoist lines rigged from either side of the shovel bail to the other end of a reduction drive mounted on the base of the shovel boom—eliminating the weight and instability of a bail sheave at the bucket, plus bad fleet angles on the hoist cables.

There are many, many more design and operating features adding up to more output—reduced maintenance costs and lower cost yardage. Before you buy any machine in this class, it will pay you to get the complete story on the sensational 4500 Vicon.

Manitowoc

MANITOWOC ENGINEERING CORP.

(A Subsidiary of The Manitowoc Company, Inc.)

Manitowoc, Wisconsin

SHOVELS	CRANES	DRAGLINES	TRENCH HOES
1¼ — 6 YDS.	25 — 125 TONS	1¼ — 7 YDS.	1¼ — 3 YDS.

(Continued from page 276)

N. C., Wake Forest—BA 3/29—Town, Town Hall, raw water supply imprvs. $70,000. Plans deposit $25. Piatt & Davis, 111 Corcoran St. Bldg., Durham, engrs.

S. C., Beaufort—ATHLETIC FIELDS—BA 3/30—School Bd., Beaufort County, athletic fields, Mossy Oaks Junior-Senior High School, Beaufort, and Ladys Island. Plans deposit $25. Jules D. Levin, 204 West St., engr.

Va., Fairfax—BA 3/30—Fairfax County Water Auth., 7310 Maple St., Annandale, Project 14, approx. 26.5 mi. 12- to 30-in. c.i., steel or prestressed concrete pressure pipe water mains. Plans deposit $50. Extended date. Greeley & Hansen, 14 East Jackson Blvd., Chicago 4, Ill., engrs. CD 3/8.

† **Va., Langley Air Force Base**—DINING HALL—BA 3/30—U. S. Eng., foot of Front St., Norfolk, dining hall, Lengley Bomarc Facilities, Langley Air Force Base, ENG-44-110-60-13,

N. C., Laurinburg—BA 3/31—City, City Hall, sewage disposal plant, $135,000. W. E. Matthews Co., Railroad Bldg., engr. CD 12/30.

† **Florida**—BA About 4/5—U.S. Eng., P.O. Box 4970, Jacksonville, Zone 1, dredging test section, Canal 43, along north side of Caloosahatchee River section of Okeechobee Waterway, between Olga and Alma, east Lee County, site in vicinity of State Rd. 80 east of Fort Myers, Central and Southern Florida Flood Control Project, CIVENG-08-123-60-46, $75,000. CD 9/29.

† **Va., Oceana**—ELECTRICAL WORK—BA 4/5—Dist. P. Wks. Office, Fifth Naval Dist., Bldg. N-26, U. S. Naval Base, Norfolk, electrical and mechanical work Bldg. 20 Naval Air Station, NBy 24502, Spec. N. 24502/59. Under $10,000. CD 9/23/57.

† **Louisiana**—BA 4/6—U.S. Eng., P.O. Box 267, New Orleans, La., East Jetty repairs, Southwest Pass, Mississippi River, approx 25 mi. below Venice. La. Serial No. 16-047-60-156. $200,000. CD 9/29.

S. C., Charleston—STORAGE TANK—BA 4/6—South Carolina State Ports Auth., Customhouse Wharf, caustic storage tank, North Charleston Ship Terminal. Plans deposit $25. Lockwood Greene Engineers, Inc., Montgomery Bldg., Spartanburg, engr. CD 5/3/57.

† **Fla., Panama City**—CONTROL TOWER—BA 4/7—U. S. Eng., P.O. Box 2301, Mobile, Ala., incased control tower, Tyndall Air Force Base ENG-01-076-60-40. CD 2/16.

S. C., Charleston—GANTRY MOUNTED—BA 4/7—South Carolina State Ports Auth., Customhouse Wharf, gantry mounted, revolving crane Columbus St. Ship Terminal. Plans deposit $25. Palmer & Baker Engineers, Inc., 2460 Government St., Mobile, Ala., engrs. CD 5/3/57.

† **Louisiana**—BA 4/12—U. S. Eng., P.O. Box 267, New Orleans, La., Item W-87.3, levee restoration, Catahoula to Charenton, WABPL extending upstream from Charenton Floodgate, St. Mary Parish, CIVENG-16-047-60-160. $100,000. CD 9/29/59.

† **N. C., Cherry Point**—STEAM GENERATING PLANT—BA 4/12—Dist. P. Wks. Office, Fifth Naval Dist., Rm. 307, Bldg. N-26, U. S. Naval Base, Norfolk, Va. steam generating plant repairs, Bldg. 152, Marine Corps Air Station, Contr. NBy 24373, Spec. 24373/59. $25,000-$100,000.

† **Fla., Mayport**—POWER FACILITIES—BA 4/13—Dist. P. Wks. Office, Sixth Naval Dist. Bldg. No. 13, U. S. Naval Base, Charleston, S. C., additional power facilities for destroyer slips, Second Increment, U. S. Naval Station, NBy 25499, Spec. 25499/59, $250,000-$500,000. CD 9/6/58.

† **Virginia**—BA About 4/14—U.S. Eng., First and Douglas Sts. N.W., Wash., D. C., modification to basement areas, Wings A and D, and bit. surf. access road, Hybla Valley, ENG-49-080-60-43 (46).

La., New Orleans—WHARF and TRESTLE IMPRVS.—BA 4/19—Port of New Orleans, No. 2 Canal St., P.O. Box 46, Zone 6, Nashville Avenue Wharf and approach trestle involving approx. 60,000 sq. yd. concrete deck on steel bearing piles from Board's stock, grading, foundations for future shed, etc. Extended date. Plans deposit $25; adv. ENR 3/24. CD 3/9.

▲† **Alabama and Georgia**—BA 4/21—U. S. Eng., P.O. Box 1169, Mobile, Ala., Columbia Lock and Dam, Chattahoochee River, incl. control station, etc., CIVENG-01-076-60-33, Approx. $10,000,000. Extended date. CD 2/23.

BUILDINGS—BA

† **Va., Norfolk**—ROOFING REPLACEMENT—BA 3/29—Dist. P. Wks. Office, Fifth Naval Dist., U. S. Naval Base, repair insulation and replace roofing, Naval Air Station, NBy 24617, Spec. 24617/60. $25,000-$100,000. CD 9/8/58.

† **Va., Quantico**—HEATING—BA 3/30—Area P. Wks. Office, U. S. Naval Weapons Plant, Wash., D. C., central heating, Bldgs. 2400, 2411, 2412 and 2413, Marine Corps Schools, NBy 27709. $25,000-$100,000. CD 9/18/57.

Va., Chesterfield—JAIL—BA 4/1—Bd. Supervs. Chesterfield Co., jail. Hinnant, Anderson & Hinnant, 517 Church St., Lynchburg, archts. CD 10/9.

Ala., Jacksonville — HOUSING — BA 4/5 — Jacksonville Housing Auth., 48 low rent housing units. $500,000. James M. Hoffman, Anniston, archt. CD 6/18.

N. C., Greensboro—DORMITORY—BA 4/5—Agricultural & Technical College, E. Market St., women's dormitory. $500,000. Plans deposit $50. Extended date. McMinn, Norfleet & Wicker, 2828 Lawndale Dr., archt. CD 3/10.

S. C., Columbia—SCHOOL—BA 4/5—Bd. Educ., 1311 Marion St., Fairfield Road Junior High School, $500,000. Plans deposit $50. Lyles, Bissett, Carlisle & Wolff, 1800 Gervais St., archts. CD 9/11.

Ga., Columbus—SCHOOL—BA 4/7—Muscogee Co. Bd. Educ., 1200 Bradley Dr., 70,000 sq. ft. South Columbus Junior High School, $800,000. Plans deposit $50. Talley & Hecht, 1320 Warren Williams Rd., archts. CD 10/22.

† **N. C., Camp Lejeune** — FLOOR RESTORATION — BA 4/12—Dist. P. Wks. Office, Bldg. N-26, Rm. 307, U. S. Naval Base, Norfolk, Va., restoration of floors, food preparation areas (1st Increment), Marine Corps Base, Contr. NBy 24514, Spec. 24514-59. $25,000-$100,000. CD 9/17/57.

† **N. C., Camp Lejeune**—ORDNANCE PLATOON FACILITIES, etc.—BA 4/12—Dist. P. Wks. Office, Fifth Naval Dist., Rm. 307, Bldg. N-26, U. S. Naval Base, Norfolk, Va., ordnance platoon facilities and high explosives magazines, Marine Corps Base, Contr. NBy 24386, Spec. 24386/59. $250,000-$500,000. CD 9/17/57.

N. C., Rocky Mount—DORMITORY-CAFETERIA—BA 4/14—North Carolina Wesleyan College, Rocky Mount, 47,000 sq. ft. dormitory-cafeteria. $600,000. Plans deposit $75. Lashmit, James, Brown & Pollock, 865 W. 4½ St., Winston-Salem, archts. CD 7/14.

▲† **Miss., Columbus**—HOUSING—BA 4/19—Base Procurement Office, Columbus Air Force Base, 340 unit Capehart Housing, Columbus Air Force Base, IFB-22-608-60-28B. Plans deposit $200. CD 1/12.

▲† **Fla., Key West**—HOUSING—BA 4/22—Dist. P. Wks., Sixth Naval Dist., Bldg. No. 13, Naval Base, Charleston, S. C., 500 unit Capehart Housing, U. S. Naval Station, NBy 29105. $8,000,000. Plans deposit $250. CD 9/30.

Fla., DeFuniak Springs—HOUSING—Bids Asked—DeFuniak Springs Housing Auth., P.O. Box 287, 50 unit housing $400,000. Thompson & Hancock, 3166 Maple Dr., Atlanta, Ga., archts. CD 3/10.

▲ **Fla., North Miami Beach**—HOSPITAL—Bids Asked—Biscayne Osteopathic Hospital Inc., c/o Smith & Korach, archts., 1630 Lenox Ave., Miami Beach, 1 story, 205x370 CB-S 100 bed Osteopathic Hospital, NE 167 St. and 18 Ave. $1,000,000. N. J. Dignum & Assocs., 260 Palmero Ave., Coral Gables, engrs.

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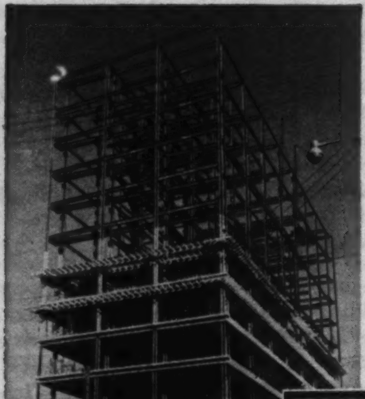

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HEAVY CONSTRUCTION—SLC

Ga., Atlanta—SWIMMING POOLS—Castle View Town & Country Club, 3133 Maple Dr. N.E., soon lets contract 3 swimming pools, $130,000. Heery & Heery, 1366 Peachtree St. N.E., archts.

BUILDINGS—SLC

S. C., Allendale—PLANT—Fred Whitaker Co., Ridge Ave. and Scott's Lane, Phila., Pa., soon lets contract 77,000 sq. ft. wool scouring plant. $750,000. John D. Latimer & Assocs., Snow Bldg., Durham, N. C., archts. CD 3/9.

HEAVY CONSTRUCTION—LB & CA

Vico Constr. Corp., P. O. Box 464, Portsmouth, Va. CA **$179,559** sanitary and storm sewers for 210 homes, Princess Anne Plaza, PRINCESS ANNE, VA., John Aragona Enterprise, Inc., Lynhaven, Va.

† **Barrus Constr. Co.**, Kinston, N. C., LB **$137,571**, conversion of Tarawa Terrace parking imprvs., Marine Corps Air Force Base, Spec. 20470/59, CAMP LEJEUNE, N. C. Dist. P. Wks. Office, Fifth Naval Dist., U.S. Naval Base, Norfolk 11, Va. Bids Mar. 8. CD 2/25, under Public Buildings.

Thompson-Arthur Paving Co., 300 Benbow Rd., Greensboro, N. C., CA **$562,909**, street imprvs., GREENSBORO, N. C. City, City Hall, Greensboro, N. C. Bids Feb. 29. CD 3/10, under LB.

South Atlantic Constructors, P.O. Box 666, Greenwood, S. C., LB **$264,136**, sewage treatment plant, ABBEVILLE, S. C. City, City Hall, Abbeville, S. C. Bids Mar. 8. CD 2/3.
C. Y. Thomason & Co., P.O. Box 232, Greenwood, S. C., LB **$169,299**, sewer lines (Abbeville, S. C.).

Kahn & Jackson, 1113 Blossom St., Columbia, S. C., CA **$58,810**, water lines, PACOLET, S. C. Town, Town Hall, Pacolet, S. C. Bids Mar. 8. CD 2/26.

† **U. S. Eng.**, 200 East St. Julian St., Savannah, Ga., rejected bids Feb. 2, auxiliary power distr. centers, transformers and switchgear, Hartwell Project, Savannah River, CIVENG-09-133-60-21, GEORGIA and SOUTH CAROLINA. CD 1/27.

Arthur Pew Constr. Co., 5007 S. Peachtree Rd., Chamblee, Ga., LB **$463,189** Contract 1 trunk sewer lines, DECATUR, GA. DeKalb Co. Bd. Comrs., 309 DeKalb Bldg., Decatur, Ga., Bids March 8. CD 2/9.
Halpin Inc., P. O. Box 592, Venice, Fla., LB **$494,900**, Contract 2, sewage treatment plant, (Decatur, Ga.).

† **Cherokee, Inc.**, P.O. Box 1296, Columbia, S. C., LB **$111,850**, SAC area access road, Robins Air Force Base, ENG-09-133-60-28, MACON, GA. U. S. Eng., 200 E. St. Julian St., Savannah, Ga. Bids Mar. 9. CD 3/2.

▲ **FLORIDA**—State Rd. Dpt., Tallahassee,
Allen M. Campbell Co., Box 836, Tyler, Tex., CA **$1,999,801** 8-lane divided 9 in. c. conc. pavement 8½ in. limerock base, type b. conc. surf. course and binder course 6½ in. limerock base shoulders with type 1-B surf. tr. 1.124 mi. SR No. 9-A FAI Proj. No. I-95-1-1 (25)7 Job No. 87270-3406 Dade Co., Bids Jan. 26, Awarded March 9. CD 1/29 under LB.

† **Hardway Dredging**, 15 E. 11 St., Box 1511, Columbus, Ga., LB Schedule A **$165,284**, Schedule B **$160,784**, (6 bidders), maintenance dredging between St. John River and Melbourne, Intercoastal Waterway, Jacksonville to Miami, CIVENG-08-123-60-38, FLORIDA. U. S. Eng., P.O. Box 4970, Jacksonville, Fla. Bids Mar. 8. CD 2/17.

Intercounty Constr. Corp., 2100 N. Dixie Highway, Wilton Manor, Fla., LB **$127,836** 9 hole Orange Brook Golf Course addn. HOLLYWOOD, FLA., City, City Hall, Hollywood, Fla., Bids March 4.

Edelblut Constr. Co., P. O. Box 845, Fort Myers, Fla., LB **$71,000** water system imprvs. treatment plant alterations clear well LAKE PLACID, FLA., City, City Hall, Lake Placid, Fla., Bids March 7. CD 2/12.

Apgar & Markham Constr. Co., Inc., 3216 Grand Ave., Miami, Fla., LB **$235,570**, (7 bidders), aircraft service equipment plant, Palmetto By-Pass near 63 St., MIAMI, FLA. J. C. Wollard, 8830 NW 32 Ave., Miami, Fla. Bids Mar. 9. CD 3/1.

R. & J. Emmons, Contrs., 2151 NW 155 St. N., Miami Beach, Fla., LB **$140,475**, (8 bidders), streets, various sections, NORTH MIAMI, FLA. City, City Hall, 776 NE 125 St., North Miami, Fla. Bids Mar. 8. CD 3/1.

Couch Constr. Co., Dothan, Ala., LB **$962,348**, (5 bidders), city-wide street paving, DOTHAN, ALA. City, City Hall, Dothan, Ala. Bids Mar. 8. CD 12/16.

City of Fayette, City Hall, Fayette, Ala., Own Forces, **$65,000**, water lines to serve extended city limits areas, FAYETTE, ALA.

Bernard & Byrd, 1809 Reddy Rd., Mobile, Ala., LB **$139,424** street clearing, grading, sidewalks, Broad through to Beauregard, MOBILE, ALA. City, City Hall, Mobile, Ala., Bids March 7. CD 2/26.

L. H. Bossier, Inc., Box 1870, Alexandria, La., LB **$254,384**, street paving involving 120,000 sq. yd. soil cement base, 9,200 tons hot mix b. conc., catch basins, drainage structure, etc., EUNICE, LA. Town, Town Hall, Eunice, La. Lindsay J. Aucoin, Box 483, Eunice, La., engr. Bids Mar. 8.

George Consolidated, Box 8305, Houston, Tex., LB **$364,565**, (7 bidders), gravity sanitary sewers, lift stations and force mains, MORGAN CITY, LA. Mayor & Council, Morgan City, La. Bids Mar. 8. CD 2/17.

▲ **T. L. James & Co., Inc.**, Box 531, Ruston, La., CA **$1,084,832**, Prop. No. 1533, East-West runway and taxiway extension, Moisant International Airport, Kenner, NEW ORLEANS, LA. City, City Hall, New Orleans, La. Bids Feb. 23. CD 2/26, under LB.

▲ **Standard Dredging Co.**, 6201 France Rd., New Orleans, La., LB **$2,091,320** (2 bidders), 2,800,000 cu. yd. hydraulic fill in Lake Pontchartrain, NEW ORLEANS, LA. Orleans Levee Dist., Royal & Conti Sts., New Orleans, La. Bids Mar. 4. CD 2/17.

Pittsburgh-Des Moines Steel Co., Praetorian Bldg., Dallas, Tex., LB **$75,950** (5 bidders), Project 2, water tank, PLAQUEMINE, LA. Mayor & Board, Town Hall, Plaquemine, La. Bids Feb. 16, awarded Feb. 19. CD 1/29, under Sewers, etc.

† **R. E. Gaddie Co.**, Bowling Green, Ky., LB **$139,460** (7 bidders) Proj. 1B1, grading, drainage, crushed aggreg. base, bit. surf. treatment, Visitor Area Parking Center, Mammoth Cave National Park, KENTUCKY. Bureau P. Rds., Dpt. Commerce, Park Headquarters, Mammoth Cave, Ky. Bids Mar. 8. CD 2/19.

† **Greer Bros. & Young**, Box 460, London, Ky., LB **$199,580**, est. $227,135 (4 bidders), access facilities, Buckhorn Reservoir, Perry Co., CIVENG-15-029-60-19, KENTUCKY. U. S. Eng., P.O. Box 59, Louisville 1, Ky. Bids Mar. 10. CD 3/2.

Walters & Prater, Inc., 4160 Prior St., Morristown, Tenn., LB Est. **$250,000** (6 bidders), terminal bldg., KNOXVILLE, TENN. Tennessee Coach Bus Line Co., W. Main and Market Ave., Knoxville, Tenn. CD 11/27.

Conlon Constr. Co., 1005 W. Kirkland Ave., Nashville, Tenn., CA **$65,000**, water pumping station Powell Ave., NASHVILLE, TENN. Radnor Water Dist. Nolensville Rd., Nashville, Tenn.

BUILDINGS—LB & CA

▲ **J. M. Turner Co.**, 317 McClanahan, S.W., Roanoke, Va., CA **$1,491,100**, PLANT OFFICES, BASSETT, VA., Bassett Furniture Industries, Bassett, Va. Bids Feb. 16. CD 2/23, under LB.

Henry D. Porter & Co., 504 Forst St., Lynchburg, Va., CA **$521,630**, MOTEL, CHARLOTTESVILLE, VA. Holiday Inn Motels, Inc., 5221 Brook Rd., Richmond, Va. CD 3/9, under LB.

Virginia State College, Petersburg, Va., rejected bids Feb. 4, INDUSTRIAL ARTS bldg., PETERSBURG, VA. CD 1/18.

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CIRCLE 282 ON READER SERVICE CARD

R. R. Marquis, Inc., 2229 County St., Portsmouth, Va., LB **$414,242** (5 bidders), Brighton ELEMENTARY SCHOOL, PORTSMOUTH, VA. Portsmouth School Bd., Portsmouth, Va. A. Ray Pentecost Jr., Colonial and 21 St., Norfolk, Va., archt. Bids Mar. 10. CD 11/18

N. C. Monroe Constr. Co., P. O. Box 2617, Greensboro, N. C., LB est. **$125,000**, mfg. PLANT addn., AHOSKIE, N. C. Ahoskie Industrial Development Co., Inc., Ahoskie, N. C. Bids Mar. 3. CD 3/1.

J. M. Thompson Co., P.O. Box 2754, Raleigh, N. C., LB **$534,890**, 75,000 sq. ft. Union HIGH-ELEMENTARY SCHOOL, LOUISBURG, N. C. Franklin County Bd. Educ., Louisburg, N. C. Bids Mar. 7. CD 1/26.

Harry Jackson & Bill Myrick, Main St., Allendale, S. C., CA **$300,000**, 50,000 sq. ft. WEAVE MILL, ALLENDALE, S. C. Fairdale Corp., F. E. Gibson, Jr., Allendale, S. C., Aberdeen Mills, lessee.

† **A. A. Maintenance Co.**, 122 Western St., Akron, O., LB **$94,337**, rehabilitation, imprv. 4 BARRACKS U.S. Naval Air Station, Glynco, NBy 25498, BRUNSWICK, GA. Dist. P. Wks. Office, Sixth Naval Dist., Bldg. No. 13, U.S. Naval Base, Charleston, S. C. Bids Mar. 9. CD 2/2.

Litt Constr. Co., 2100 SW 87 Ave., Miami, Fla., CA Approx. **$450,000**, 48 RESIDENCES, S.W. 93 Ave., S.W. 57 Terrace, S.W. 56 St. and S.W. 92 Ave., MIAMI, FLA. Malibu Homes, 9241 S.W. 56 Terrace, Miami, Fla. Joel Meyer, 1090 N.E. 79 St., Miami, Fla., archt.

Daniel Constr. Co., P.O. Box 10085, Jacksonville, Fla., CA **$750,000**, SHOPPING CENTER, ORLANDO, FLA. Edgewater Shopping Center, Inc., c/o contractor. Bids Jan. 12. CD 1/12.

Sorensen & Fletcher, 645 E. Colonial Dr., Orlando, Fla., LB **$194,893**, WAREHOUSE, ORLANDO, FLA., AFB Windows of Orlando, Inc., c/o contractor.

▲ **Richardson Constr. Co. Inc.**, 3100 7 Ave., S. Birmingham, Ala., LB **$1,250,000** 40-lane BOWLING CENTER Montgomery Highway, South Vestavia Shopping Center, VESTAVIA, ALA., Vestavia Bowling Lanes, Inc. Vestavia, Ala., Andrew H. Payne, Jr., 2811 S. 18 St., Birmingham, Ala., engr.

▲ **M. T. Reed Constr. Co.**, 162 Millsaps Ave., Jackson, Miss., Owner Builds, **$2,000,000**, APARTMENT, JACKSON, MISS. John S. Winbigler, 162 Millsaps Ave., Jackson, Miss., archt.

Perrilliat-Rickey Constr. Co., Box 13128, New Orleans, La., LB **$529,400**, (10 bidders), SCHOOL and CONVENT, KENNER, LA. Our Lady of Perpetual Help Catholic Church, Kenner, La. John M. Lachin, 3505 Toulouse St., New Orleans, La., archt.

Bartley, Inc., Box 344, Lake Charles, La., LB **$534,260**, (9 bidders), LIBRARY, McNeese State College, LAKE CHARLES, LA. State Bd. Educ., Capitol Bldg., Baton Rouge, La. Bids Mar. 3. CD 2/17.

Great Lakes Constr. Corp., 111 W. Washington, Chicago, Ill., CA Est. **$183,000**, 1 story, no bsmnt., 133x247 ft. WAREHOUSE and OFFICE, LEXINGTON, KY. McKesson & Robbins Drug Co., 155 E. 44th St., New York, N. Y.

Sullivan & Cozart, 822 W. Kentucky St., Louisville 2, Ky., CA Est. over **$400,000** (4 bidders), 1 story, 70,000 sq. ft. brick, concrete block DEPARTMENT STORE, Crittenden Dr., LOUISVILLE, KY. Brown Hotel Corp., 4th and Broadway, Louisville 2, Ky. Alvin H. Einmender, 10900 Page Ave., St. Louis, Mo., lessee. Sommerich & Wood, 8135 Forsythe Blvd., Clayton, Mo., archts. Bids Mar. 1. CD 11/10/58.

▲ **Clark Constr. Co.**, 1919 Parrish Ave., Owensboro, Ky., CA **$1,997,000**, MEN'S DORMITORY, WOMEN'S DORMITORY, MARRIED STUDENTS HOUSING, Eastern State College, RICHMOND, KY. Commonwealth of Ky., Div. Purchases, Frankfort, Ky. Bids Feb. 4, awarded Feb. 25. CD 2/9, under LB.

O. B. Davis, 641 N. Market St., Chattanooga, Tenn., LB **$162,000** bottling PLANT addn. and alterations, CHATTANOOGA, TENN., Coca-Cola Bottling Co., c/o Selmon T. Franklin, archt., 142 N. Market St., Chattanooga, Tenn.

Charles Hancock, Hendersonville, Tenn., CA **$125,000**; design and construct PLANT addn., HENDERSONVILLE, TENN., Precision Marine Co., Hendersonville, Tenn. CD 3/1.

MIDDLE WEST

HEAVY CONSTRUCTION—BA

▲ **O., Cincinnati**—BA 3/29—City, City Hall, Millcreek Interceptor sewer, $3,000,000. Plans deposit $5. CD 12/3.

Ill., Joliet—BA 4/1—Bd. Comrs. Will Co., Courthouse, grading, paving 3.48 mi., 1,720 ft. 6- to 15-in. storm sewers, $122,000. CD 6/5.

Ill., Steeleville—BA 4/4—Village, Village Hall, water and sewer extensions, lift station, force main, sewage plant imprvs., appurtenances, replacing pumping equipment, control house, waste stabilization pond, $95,000. Russell, Axon & Assocs., Suite 205, 408 Olive St., St. Louis 2, Mo., engrs. CD 11/11.

† **Illinois**—BA About 4/5—U. S. Eng., 475 Merchandise Mart, Chicago, Zone 54, rein.-con. water reservoir, deep well turbine type booster pump, degasifer, related piping, electrical work, fencing, grading, Site SL-10 near Marine, St. Louis Defense Area, Eng. 11-032-60-39, $15,000.

† **Illinois**—BA 4/20—U. S. Eng., 420 Locust St., St. Louis 2, Mo., levee imprvts., East St. Louis and vicinity (East Side Levee and Sanitary Dist. Proj. Item I-R(4) east bank Mississippi River abt. 181

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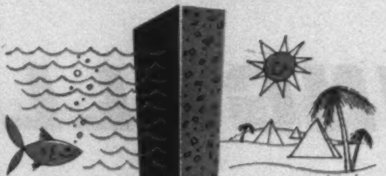

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mi. above Ohio River involving abt. 0.5 mi. earthen levee enlargement, CIVENG-23-065-60-42, $400,000. CD 11/9/55.

BUILDINGS—BA

Ill., Chicago—TEACHERS COLLEGE—BA 4/4—Bd. Educ., 228 N. LaSalle St., electrical contract for Chicago Teachers College. Bids Feb. 23 rejected. CD 2/29 under LB.

Wis., Manitowoc—JAIL AND TRAFFIC CENTER—BA 4/13—Manitowoc Co., 3 story, 65 x 110 ft. jail and traffic center, $625,000. Plans deposit $50. R & S, 812 Marshall St., archts. CD 9/4.

BUILDINGS—SLC

▲ Ill., Chicago—HOSPITAL—Michael Reese Hospital, 29th and Ellis Ave., soon lets contract 3 story hospital, Kaplan Surgical Wing, $2,000,000. Loebl, Schlossman & Bennett, 333 N. Michigan Ave., archts. CD 3/6/59.

Wis., Sheboygan—WAREHOUSE—Schultz Bros., 2215 Union Ave., soon lets contract 25,000 sq. ft., block, steel warehouse addn., rein.-con. fdn. $250,000. E. R. Wasserman, 722 Michigan Ave., archt. CD 11/2.

HEAVY CONSTRUCTION—LB & CA

A. F. Jelen & Sons Inc., 7426 Harrison St., Cincinnati, O. LB **$348,632**, (5 bidders), water lines, 36 in. mains, Anthony Wayne, Sheehan Aves. CINCINNATI, O. City, City Hall, Cincinnati, O. Bids Mar. 9. CD 3/10.

Ben Davis, Inc., 3099 Sullivant Ave., Columbus, O. LB **$136,674**, relocating water mains, 1st Ave. to Maynard Ave. section of North Freeway, COLUMBUS, O. City, City Hall, Columbus, O. Bids Feb. 10. CD 9/10.

High Voltage Systems, Inc., 903 Dearborn St., Toledo, O., CA **$127,892** 2 mi. 23,000 volt transmission lines for West Side Municipal Power Plant, CUYAHOGA FALLS, O. City, City Hall, Cuyahoga Falls, O. Bids Feb. 8. CD 1/21.

Shullo Constr. Co., 1200 Home St., Akron, O., CA **$500,000**, streets and utilities to serve Northfield Square Housing Proj., NORTHFIELD, O. Glasier-Marotta Co., 20015 Shaker Blvd., Cleveland 22, O. CD 3/24.

ILLINOIS—Dpt. P. Wks. & Bldg., Div. Hys., Centennial Bldg., Springfield,

Ill.—**A. J. Walker Constr. Co.**, Mattoon, Ill., CA **$138,000**, 3-span steel WF beam bridge over Flat Creek on US Rte. 51, approx. ½ mi. north of Vernon, rein.-con., triple box culvert for Cassar Creek, wid'n. two existing bridges, rein.-con. slab over Steve Creek, 3-span steel WF beam over North Fork Kaskaskia River, U. S. Rte. 51 between Snobonier and Patoka, Fayette and Marion Counties;

Ill.—**Caldwell Engineering Co.**, Jacksonville, Ill., CA **$95,985**, 3-span WF beam railroad grade separation structure (carrying FA Rte. 94 over Wabash RR) FA Rte. 92, approx. ¾ mi. west of Jacksonville, Morgan Co. Bids Feb. 19. CD 2/2.

ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield,

Rein, Schultz & Dahl, Inc., and J. L. Sullivan & Sons, Inc., 119 E. Washington St., Madison, Wis., CA **$571,414**, concrete pavement 2.47 mi. US 52 from approx. 1 mi. southwest to 1 mi. east of Mt. Carroll, Carroll Co. Bids Feb. 19. CD 2/24, under LB.

Ted Zontelli Constr. Co., Ironton, Minn., CA **$149,764** (3 bidders), 102.38 mi. buried cable and wire 8.52 mi. services 435 station installations Knox Co. Proj. Ill. 511E-Mid Century, ILLINOIS. Mid Century Telephone Cooperative, 122 N. Avenue A., Canton, Ill. Bids Mar. 8. CD 2/11.

▲† **Eugene Luhr & Co.**, P. O. Box 48, Columbia, Ill. LB **$1,065,260** est. $1,019,482, (7 bidders), South Pumping Station and Canal No. 1 Pumping Station, East St. Louis and Vicinity Proj. Items III-G and III-E. East Side Levee & Sanitary Dist., CIVENG, 23-065-60-36, ILLINOIS-U. S. Eng., 420 Locust St., St. Louis 2, Mo. Bids Mar. 10. CD 2/4.

H. A. Grabbe, Godfrey, Ill., LB **$260,000**, water and sewerage system, ALHAMBRA, ILL. Village, Village Hall, Alhambra, Ill. Flagg & Corlew, 116-A St. Louis St., Edwardsville, Ill., engrs. Bids Feb. 25.

▲ **J. P. Constr. Co.**, 1750 State St., Chicago Heights, Il., LB **$1,284,131**, No. 062-02-5-CF, widen, resurf. 3.58 mi. Chicago Rd., Thornton, CHICAGO, ILL. Bd. Comrs. Cook Co., County Bldg., Chicago 2, Ill. Bids Mar. 8. CD 2/25;
Rossi Trucking Co., 1825 S. Kostner Ave., Chicago, Ill., LB **$782,786**, No. 066-1717A, grading South Rte. Expressway, 79th to 87th Sts. (Chicago, Ill.);
Arcole Midwest Corp., 3225 Main St., Skokie, Ill., LB **$389,519**, est. $325,000, No. 046-1716, widen, resurf., bit. paving, Carpenter Rd. (Chicago, Ill);
Standard Paving Co., 308 W. Washington St., Chicago 6, Ill., LB **$156,534**, No. 051-3640.1 reconstr., median strip, bit. resurf., curb and gutter Crawford Ave. (Chicago, Ill.).

Orr Constr. Co., 27 19th Pl., Chicago Heights, Ill., LB **$208,000**, est. $125,000, 2 underpasses E J & E RR, and Orchard Dr., Sec. 10-A-cs and 10-B-cs PARK FOREST, ILL. Village, Village Hall, Park Forest Ill. A. Epstein & Sons, 2011 Pershing Rd., Chicago, Ill., engrs. Bids Mar. 7. CD 2/23.

Engledue Constr. Co., 404 E. Summit St., Macomb, Ill. CA **$132,241**, sanitary sewerage system, incl. (A) 17,423 ft. 8 in. sewers, 62 manholes (B) sewage treatment plant, pumping station, oxidation pond ROCHESTER, ILL. Village, Village Hall, Rochester, Ill. Crawford, Murphy & Tilly, 755 S. Grand Ave. W., Springfield, Ill., engrs. Bids Mar. 2. CD 7/27.

(Continued on page 286)

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REINFORCED PRIMACORD

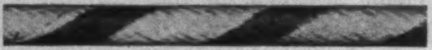
Textile reinforced, tough, resilient, flexible. Recommended for surface trunklines and deep holes where normal strength and resistance to abrasion and cutting are needed. Tensile strength 150 lbs. 1000-ft. spool 18.5 lbs. Colors: Red stripe on yellow.

PLAIN PRIMACORD

Textile-covered, flexible and resilient. Suitable for surface trunklines and shallow holes where tensile strength and resistance to abrasion and cutting are not required. Tensile strength 125 lbs. 1000-ft. spool 17.5 lbs. Color: Yellow.

PLASTIC REINFORCED PRIMACORD

Covered with tough plastic material, not affected by high Summer heat or Winter cold. Waterproof—resistant to acids commonly encountered. Use for extremely deep holes, river crossings, field shots that must stand for long periods of time and in other wet conditions. Tensile strength 275 lbs. 1000-ft. spool 21 lbs. Color: White.



PLASTIC WIRE COUNTERED PRIMACORD

A strong, tough Primacord, armored with wire and covered with a plastic material. Recommended for use in deep, ragged holes or with metal or fibre explosives containers, where strength and resistance to abrasion and cutting are essential. Tensile strength 300 lbs. 1000-ft. spool 31.5 lbs. Colors: red "barber pole" on white.

LO-TEMP PRIMACORD

Jacket of polyvinyl chloride plastic over rayon yarn countering gives this cord exceptional flexibility, with textured surface, slightly tacky. Cord has outstanding handling characteristics at all atmospheric temperatures. It bends easily and knots securely at *minus* 40°F. Recommended for trunklines and for downlines where abuse is not excessive. Tensile strength 190 lbs. 1000-ft. spool 19.5 lbs. Color: Yellow.

FIVE TYPES OF PRIMACORD® DETONATING FUSE

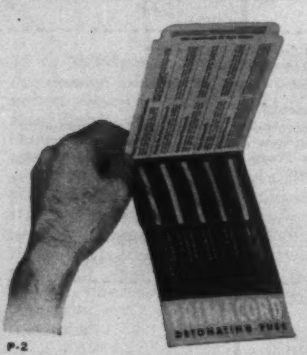
to meet varying blasting conditions

Primacord is used primarily for initiating commercial explosives. It consists of a core of high explosive encased in various combinations of protective coverings. When initiated with fuse and cap or electric blasting cap, it detonates along its entire length at a velocity of nearly four miles per second and with the initiating energy of a blasting cap at all points. A Primacord trunkline will initiate any number of additional lengths through simple knot connections. In a downline it will detonate cap-sensitive explosives with which it comes in contact.

Primacord is less sensitive to accidental detonation than the main charge of standard explosives. On at least one occasion it failed to detonate when directly struck by lightning.

CONDITIONS	*PRIMACORD DETONATING FUSE*				
	Plain	*Lo-Temp*	*Rein-forced*	*Plastic Reinforced*	*Plastic Wire Countered*
Trunklines	X	X	X		
Small diameter holes — 1½"–2¾"	X		X		
Holes 3" dia. and greater, depending on depth			X	X	X
Secondary Blasting	X		X		
Deep, ragged holes			X	X	X
Deep, wet holes				X	X
When a field shot must stand a long time				X	X
Loading with heavily reinforced explosives containers					X

Primacord is available through your regular explosives supply sources.



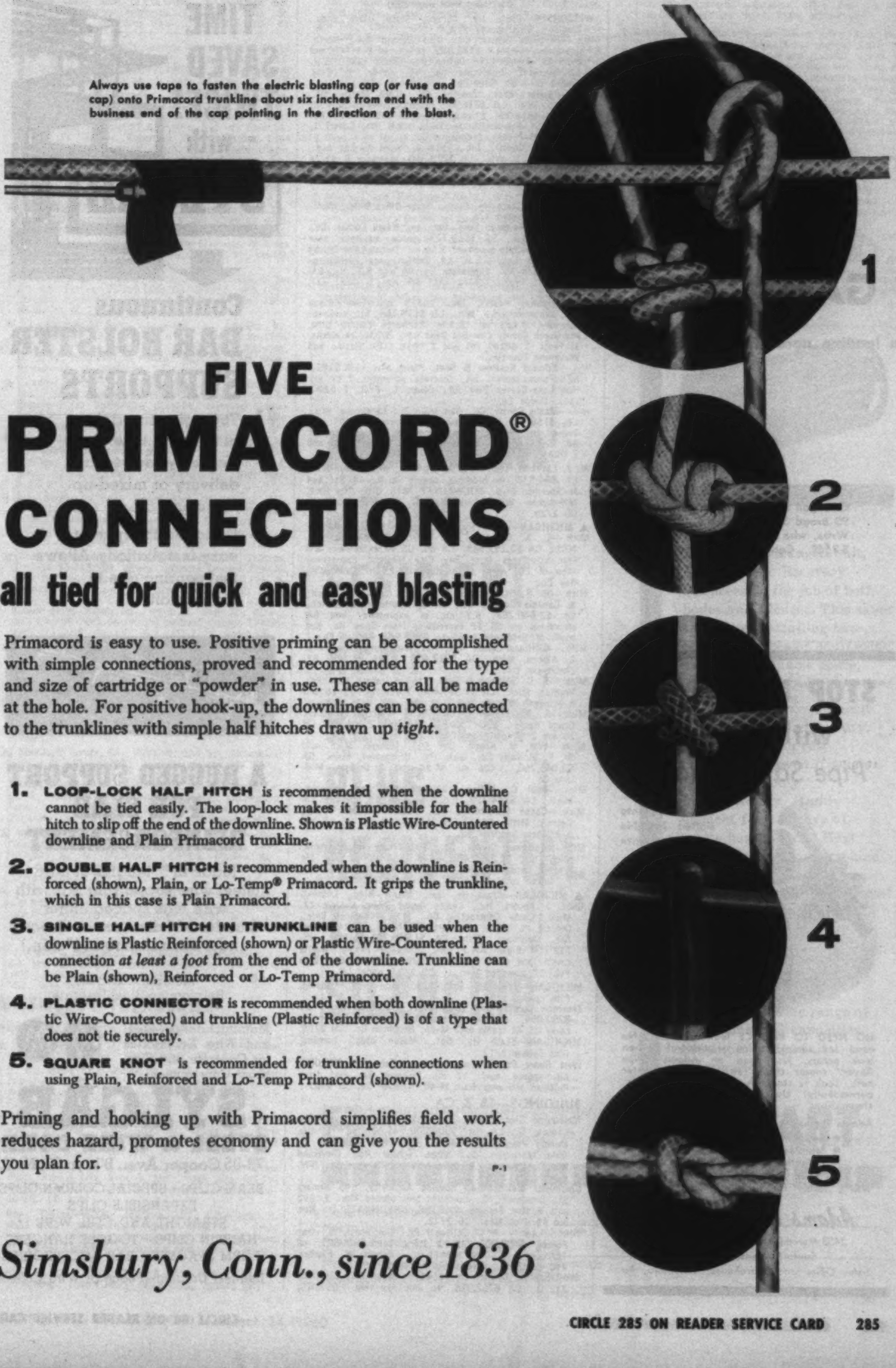
Free Sample Kit

contains dummy samples of five types of Primacord with brief descriptions. When you write for it, tell us about the job.

P-2

The ENSIGN-BICKFORD COMPANY

Always use tape to fasten the electric blasting cap (or fuse and cap) onto Primacord trunkline about six inches from end with the business end of the cap pointing in the direction of the blast.



FIVE PRIMACORD® CONNECTIONS

all tied for quick and easy blasting

Primacord is easy to use. Positive priming can be accomplished with simple connections, proved and recommended for the type and size of cartridge or "powder" in use. These can all be made at the hole. For positive hook-up, the downlines can be connected to the trunklines with simple half hitches drawn up *tight*.

1. **LOOP-LOCK HALF HITCH** is recommended when the downline cannot be tied easily. The loop-lock makes it impossible for the half hitch to slip off the end of the downline. Shown is Plastic Wire-Countered downline and Plain Primacord trunkline.
2. **DOUBLE HALF HITCH** is recommended when the downline is Reinforced (shown), Plain, or Lo-Temp® Primacord. It grips the trunkline, which in this case is Plain Primacord.
3. **SINGLE HALF HITCH IN TRUNKLINE** can be used when the downline is Plastic Reinforced (shown) or Plastic Wire-Countered. Place connection *at least a foot* from the end of the downline. Trunkline can be Plain (shown), Reinforced or Lo-Temp Primacord.
4. **PLASTIC CONNECTOR** is recommended when both downline (Plastic Wire-Countered) and trunkline (Plastic Reinforced) is of a type that does not tie securely.
5. **SQUARE KNOT** is recommended for trunkline connections when using Plain, Reinforced and Lo-Temp Primacord (shown).

Priming and hooking up with Primacord simplifies field work, reduces hazard, promotes economy and can give you the results you plan for.

P-1

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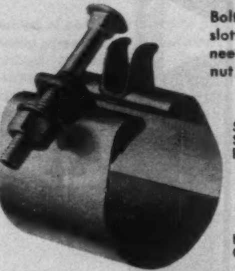
"Pipe Saver" Clamps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Stainless Steel Band
Neoprene Gasket

NO NEED TO REPLACE leaking pipes! No need for complete line shut-down! When leak occurs, just snap an Adams "Pipe Saver" repair clamp on pipe and tighten bolt. Leak is stopped—instantly, completely, permanently! Use on gas, oil, water and steam lines.

Adams Clamps are UNEQUALLED:

- Resilient neoprene gasket
- Stainless steel band
- Patented contour lug design
- Many in service over 20 years

WRITE today for literature and prices.

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South El Monte, California
Sales Office and Warehouse: Columbia, Pa.

(Continued from page 283)

WISCONSIN—State Hy. Comm., State Office Bldg., Madison, Bids opened 3/8,

Wis.—**Pertzsch Constr. Co.**, 230 Second Ave., North, Onalaska, Wis., LB **$115,825**, structures B-56-44 and B-56-45, Tomah-Lake Delton Rd. (Blass Lake-U.S.H. 12 Section), Interstate Hy. 90, Contr. 2, Proj. I-90-2 (26) 89, Sauk Co.;

Wis.—**Pheifer Bros. Constr. Co.**, 126 Meade St., Neenah, Wis., LB **$218,445**, structures B-44-26, 30, 31 and C-44-18, 27 Appleton-East County Line Rd. (Meade St.-French St. Section), U.S.H. 41, Contr. 1, Proj. F 03-2 (56), Outagamie Co.

Wis.—**R. W. Constr., Inc.**, 3218 W. Fond du Lac Ave., Milwaukee 10, Wis., LB **$213,363**, structure B 40-76 and approaches North-South Expressway (Ramp C Section Bridge), Contr. 1, Proj. T 077-1 (9), Milwaukee Co. CD 2/18.

WISCONSIN—State Hy. Comn., State Office Bldg., Madison, Bids opened 3/8,

Wis.—**James Peterson Sons, Inc.,** and **Kluck Constr. Co.**, Medford, Wis., LB **$510,723**, grade, sub-base, base and bit. concrete pavement 3.59 mi. Tomah-Lake Delton Rd. (Blass Lake-U.S.H. 12 Section) and Reedsburg-Lake Delton Rd., Interstate Hy. 90 and S.T. Hy. 23, Contr. 1, Projs. I-90-2 (26) 89 and S 0223 (1), Sauk Co.;

Wis.—**Highway Pavers, Inc.**, 10815 Watertown Plank Rd., Wauwatosa 13, Wis., LB **$119,164**, bit. concrete pavement 5.603 mi. S.T.H. 83-North County Line, and South County Line-Big Bend Rds., S.T.H. 24, Contr. 1, Projs. T 08182 (9) and T 0818 (10). Racine and Waukesha Counties.

Wis.—**Edward Kraemer & Sons**, Plain, Wis., LB **$181,621**, base course, bit. concrete pavement 7.39 mi. Fox Lake-Beaver Dam Rd., Contr. 1, Proj. T 029-1 (10). Dodge Co.

Wis.—**Mathy Constr. Co.**, 524 Main St., La Crosse, Wis., LB **$158,992**, bit. concrete pavement 7.803 mi. Second St., City of Hudson and the Houlton-Somerset Rd., S.T. Hy. 56, Contr. 1, Projs. T 028-2 (15) and T 028-2 (16). St. Croix Co. CD 2/18.

W. J. Lazynski, Inc., 4445 N. 124 St., Milwaukee, Wis., CA **$94,538**, (5 bidders), sewers in N. 44 St. and N. Sherman Blvd., MILWAUKEE, WIS. City, City Hall, Milwaukee, Wis. Bids Mar. 4, awarded Mar. 9. CD 2/29.

▲ **MICHIGAN**—State Hy. Dpt., Mason Bldg., Lansing,

Mich.—**L. A. Davidson**, 213 E. St. Joseph, Lansing, Mich., CA **$2,193,565**, 3.5 mi. US on expressway and four structures from Bay City Midland Expressway (new M 20) north to existing US-23 in Kawkawlin, Bay Co.;

Mich.—**H. F. Stukey**, US 27, North, Coldwater, Mich., & **Canonie Constr. Co.**, M-43, South Haven, Mich., CA **$3,040,287**, 6.7 mi. of expressway and five structures on US 12 expressway from Snow Rd. just south of Bridgman south to Easy Rd., Berrien Co.;

Mich.—**Gilliland Constr. Co.**, 422 Washington Ave., Rte. 2, Alpena, Mich., CA **$917,450**, 3.126 mi. US 27, Cheboygan Co.:

Mich.—**S. D. Solomon & Sons**, 3760 Elizabeth Lake Rd., Pontiac, Mich., CA **$1,519,460**, 2.016 mi. US 16 and 2 bridges, Kent Co.

Mich.—**L. W. Edison & Co.**, 3134 Midland Dr. S.E., Grand Rapids, Mich., CA **$1,714,368**, 2.003 mi. US 16 and 2 bridges, Kent Co.

Mich.—**Wm. M. Knapp**, Box 593, Monroe, Mich. and **W. F. McNally Co.**, Dixie Hy., Bridgeport, Mich., CA **$2,045,760**, 3.486 mi. M-20 and 2 bridges, Midland Co.

Mich.—**Paul C. Miller**, 10300 Sparta Ave., Sparta, Mich., CA **$544,322**, 2.053 mi. US 16, Ottawa Co.

Mich.—**Cooke Contracting Co.**, 1116 Penobscot Bldg., Detroit, Mich., CA **$1,626,363**, 4.518 mi. US 23 and 3 bridges, Saginaw Co.

Mich.—**Holloway Constr. Co.**, 29350 Joy Rd., Livonia, Mich., CA **$2,226,148**, 4.978 mi. US 12 and six bridges, Washtenaw Co. Bids Feb. 17, awarded Mar. 1. Grand total $15,827,724. CD 2/24, under LB.

▲ **MICHIGAN**—State Hy. Dpt., Mason Bldg., Lansing, **Chas. J. Rogers, Inc.**, 14836 Grand River, Detroit 27, Mich., **Cooke Contracting Co.**, 1116 Penobscot Bldg., Detroit 26, Mich. and **Jutton-Kelly Co.**, 13240 Alber Ave., Dearborn, Mich., CA **$1,169,701**, bridge, US-112 (Michigan Ave.) incl. approach paving, utility constr. and pump house in Dearborn, Wayne Co. Bids Feb. 17, awarded Mar. 1. CD 2/24, under LB.

MICHIGAN—State Hy. Dpt., 732 Mason Bldg., Lansing, Bids opened 3/9,

Thornton Constr. Co., 1028 Ethel, Hancock, Mich., LB **$200,054**, approaches Houghton-Hancock Bridge to carry US 41 traffic onto M-26, Houghton Co. CD 2/29.

MICHIGAN—State Hy. Dpt., Mason Bldg., Lansing, Bids opened 2/11,

West Shore Constr. Co., Zeeland, Mich., LB **$96,080**, bit. aggreg. surf. 12 mi. Pullman Rd. east from Pullman and west from M-40, Allegan Co. CD 1/22.

BUILDINGS—LB & CA

Melbourne Bros. Constr. Co., 5520 Cleveland Ave. NW, Canton, O., CA Est. **$500,000**, 41,000 sq. ft. machinery rebuilding PLANT, Perry Rd. CANTON, O. Ohio Machinery Co., 6606 Schaaf Rd., Cleveland 31, O. **Lawrence & Dykes**, 125 Velleyview St. NW, Canton, O., archts.

Cincinnati Metropolitan Housing Authority, 595 Armory St., Cincinnati, O., cancelled bids opened Mar. 3, 292 unit Winton Terrace HOUSING, CINCINNATI, O. New bid April or May. CD 2/12.

Drexel Lawson, 8077 Stillwell Rd., Cincinnati, O., Own Forces, **$480,000**, 32, 1 story, brick HOUSES, off Townsley Dr., CINCINNATI, O. **Robert W. Fischer**, 490 Leath St., Cincinnati, O., engr.

Drost-Sanford Constr. Co., 2193 S. Green Rd., Cleveland 21, O., CA **$762,318**, 96 unit low rent HOUSING,

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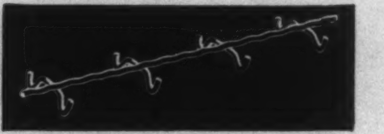

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Garden Valley area, CLEVELAND, O. Cleveland Metropolitan Housing Authority, 1332 W. 28th St., Cleveland 13, O. Bids Feb. 3, awarded Feb. 26. CD 2/25, under LB.

Leo W. Schmidt Co., 9920 Granger Rd., Cleveland 25, O., LB **$609,950,** (10 bidders), Whittier Ave. ELEMENTARY SCHOOL, CLEVELAND, O. Bd. Educ., 1380 E. 6th St., Cleveland 14, O. Bids Mar. 9. CD 2/15.

▲ **E. J. Frankel Enterprises,** 2201 Pennsylvania Ave., Phila., Pa., Own Forces, **$4,000,000,** 16 story, 155 suite APARTMENT, E. Broad and Woodland Ave., COLUMBUS, O. Nowicki & Polillo, 545 N. 23rd St., Phila., Pa., archts. Robert S. Curl & Assocs, 1309 E. Broad St., Columbus, mech. engrs, David Bloom, 1411 Walnut St., Phila., Pa., structural engr.

▲ **Saks & Goldberg,** 2168 S. Taylor Rd., Cleveland 18, O., Own Forces, **$1,200,000,** 50 HOMES, Rose Blvd., HIGHLAND HEIGHTS, O.

Henry Stock & Sons, 330 Leo St., Dayton, O., CA Est. **$400,000,** AUTOMOBILE SALES and SERVICE CENTER, KETTERING, O. Stenger's, Inc., 817 N. Main St., Dayton, O. Stiles and Robert Clements, Wilshire St., Los Angeles, Calif., archts. Geroge M. Neufer, 255 Main St., Dayton, O., engr.

▲ **Saks & Goldberg,** 2168 S. Taylor Rd., Cleveland 18, O., Own Forces, **$1,250,000,** 55 HOMES, Big Creek Parkway and two adjacent streets, MIDDLEBURG HEIGHTS, O.

W. B. Fossom & Sons, 617 16th St., Ashland, Ky. LB **$420,487,** (11 bidders), HIGH SCHOOL, WATERLOO, O. Symmes Valley Local School Dist., Waterloo, O. C. M. Donaldson & Assocs., National Bank Bldg., Portsmouth, O., archts.

▲ **Glenroy Constr. Co.,** 450 S. Ritter St., Indianapolis, Ind., Owner Builds, **$2,000,000** 145,632 sq. ft. Esquire Plaza SHOPPING CENTER, fronting Pendleton Pike near Franklin Rd. with 2,500-car parking lot, LAWRENCE, IND.

Abbot Constr. Co., 5789 N. Lincoln Ave., Chicago, Ill., LB **$829,900,** general contract, John C. Calhoun SCHOOL, 2850 W. Jackson Blvd., CHICAGO, ILL. Bd. Educ., 228 N. LaSalle St., Chicago, Ill. Bids Mar. 7. CD 2/10.

† **Alan Constr Co.,** 836 Skokie Blvd., Northbrook, Ill., CA **$416,455,** U. S. Marine Corps Reserve TRAINING CENTER Foster Ave. near Kedzie Ave., Spec. 26151/59, CHICAGO, ILL. Dist. P. Wks. Office, 9th Naval Dist., Bldg. 1-A, Great Lakes, Ill. Bids Jan. 12. CD 12/11.

▲ **Chell & Anderson, Inc.,** 5425 N. Kedzie Ave., Chicago, Ill., CA **$3,718,500,** general contract Chicago TEACHERS COLLEGE, CHICAGO, ILL. Bd. Educ., 228 N. LaSalle St., Chicago, Ill. Bids Feb. 23. CD 2/26, under LB;
Cicero Sheet Metal, Inc., 5949 W. 31st St., Cicero, Ill., CA **$541,995,** ventilating contract Chicago TEACHERS COLLEGE (Chicago, Ill.). CD 2/29, under LB.

▲† **Turner Constr. Co.,** 150 E. 42nd St., New York 17, N. Y., CA **$1,184,000,** addnl. STRUCTURES, Zero Gradient Synchrotron, Argonne National Laboratory, LEMONT, ILL. Atomic Energy Comn., Bailey and Bluff Rds., Lemont, Ill. CD 7/28.

Droessler Constr. Co., Kieler, Wis., CA **$568,881,** general contract HIGH SCHOOL, LANCASTER, WIS. Bd. Educ., Lancaster, Wis., Bids Feb. 24, CD 3/4, under LB.

▲ **Hunzinger Constr. Co.,** 4577 N. 124 St., Milwaukee, Wis., CA **$1,322,908,** general contract SCIENCE, MILWAUKEE, WIS. Bd. Regents, University of Wisconsin, Madison, Wis; Bids Feb. 2, CD 2/9 under LB;
J. E. Robertson, 1423 Underwood Ave., Wauwatosa, Wis., CA **$556,701,** heating ventilating air conditioning and plumbing for science, (Milwaukee, Wis.).

▲ **Hunzinger Constr. Co.,** 4577 N. 124 St., Milwaukee, Wis., CA Est. **$4,250,000,** general contract 21 story, 147,000 sq. ft. MEDICAL CENTER, MILWAUKEE, WIS. Juneautown Corp., 1205 N. Van Buren St., Milwaukee, Wis. CD 7/30.

O. E. Madsen & Son, Sexton Bldg., Minneapolis, Minn., LB **$443,500,** (3 bidders), general contract SUNDAY SCHOOL AND CHURCH, MOUNT HOREB, WIS., Lutheran Church, Mount Horeb, Wis. Bids Feb. 18. CD 2/2.

F. J. Piette & Sons, 1108 N. Oneida St., Appleton, Wis., CA Est. **$750,000,** HOME FOR AGED, WAUPACA, WIS. Bethany Lutheran Home for Aged, Waupaca, Wis. Bids Dec. 11. CD 11/24.

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HEAVY CONSTRUCTION—BA

▲ **Neb., Omaha**—BA 3/29—City, City Hall, 19th and Farnam Sts., sewers. $2,000,000. CD 10/28/52.

† **S. D., Rapid City**—PARKING LOTS—BA 4/4—Base Procurement Officer, Ellsworth Air Force Base, extend existing parking lots, Base Hospital, Ellsworth Air Force Base, IFB 39-601-60-418. CD 9/28.

† **Kansas and Missouri**—BA 4/5—U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo., constr. and repair dike and revetment Leavenworth Reach to Parkville Bend, IFB 60-57. CD 3/9.

† **Kansas**—BA 4/5—U. S. Eng., 1800 Federal Office Bldg., Kansas City, Zone 6, Mo., repair dike and revetment, Atchison Bend to Leavenworth Reach, IFB-60-56. CD 3/9.

† **Kan., Olathe**—BLDG. IMPRVS.—BA 4/5—Dist. P. Wks. Office, Ninth Naval Dist., Bldg. 1-A, Great Lakes, Ill., repairs and alterations to Bldgs. Nos. 22, 38 and 43, Naval Air Station, Spec. No. 26134/60. $100,000-$250,000.

† **Kan., Salina**—LIQUID OXYGEN FACILITY—BA 4/5—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., liquid oxygen facility, Schilling Air Force Base, IFB 60-64. Plans deposit $5. CD 3/9.

▲† **Tex., Dallas**—AIR NATIONAL GUARD FACILITIES—BA 4/5—Officer in Charge of Construction, 8th Naval Dist., Bldg. 16, U. S. Naval Station, New Orleans (Algiers), La., Air National Guard facilities, hangar, Naval Air Station, NBy-23789, Spec. No. 23789/59. $1,000,000. Extended date. CD 2/26.

Tex., Fort Worth—BA 4/5—City, City Hall, 36 in. Whitesettlement water feeder main. $426,000. Plans deposit $25. Reaves & Gregory, 3332 West 7th St., Fort Worth, Tex., engrs. Extended date. CD 2/15.

† **Tex., Fort Worth**—AIR BASE FACILITIES—BA 4/6—U.S. Eng., 100 West Vickery Blvd., Fort Worth, addn. of ceiling insulation and gravel guard extension to 250/500 bed hospital, Carswell Air Force Base, Inv. No. ENG-41-443-60-27. CD 10/31/51.

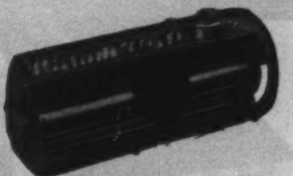
† **Missouri and Nebraska**—BA 4/7—U. S. Eng., 1709 Jackson St., Omaha, Neb., constr. and repair dikes and revetments Omaha to Rulo at lower Barney, lower Arago Bends, Missouri River, vicinity of Corning, Mo., CIVENG-25-066-60-71. $400,000. Plans deposit $5. CD 9/30.

† **Montana** — MVAR CAPACITORS, etc. — BA 4/8 — Bonneville Power Admin., 1001 N.E. Lloyd Blvd., Portland, Ore., 11 MVAR capacitors and cathodic protection at Silver Bow substation and cathodic protection at Anaconda substation, Silver Bow and Deer Lodge Counties. Inv. 9094. Plans deposit $15.

† **Arkansas and Oklahoma**—BA About 4/12—U.S. Eng., P.O. Box 867, Little Rock, Ark., approx. 3,970 lin. ft. pile dike with timber pile and stonefill, 1,000 lin. ft. dike bankhead with quarry-run stone with fines, and 875 lin. ft. trenchfill revetment consisting trenchfill and bank paving with quarry-run stone with fines and preforming dust and erosion control work, Pulaski County Penal Farm, Revetment and Dikes, right bank of Arkansas River between River Miles 176.8 and 175.4, Pulaski County, Arkansas, CIVENG-03-050-60-59. $300,000. CD 9/30.

† **Missouri**—BA On Or About 4/12—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., 230 lin. ft. pile dike terminal, 4,400 lin. ft. stone fill, etc., Lexington Reach to Miami Bend, River Mile 321.2 to 264.6, Missouri River, Waverly, Mo., CIVENG-23-028-60-59. $400,000. CD 9/30, under Nebraska, Kansas and Missouri.

† **Missouri**—BA On Or About 4/12—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., 100 lin. ft. pile dike terminal, 5,600 lin. ft. stone fill in and along pile dike, etc., Quindaro Bend to Lexington Reach, River Mile 385.0 to 321.2, Missouri River, CIVENG-23-028-60-58. $300,000. CD 9/30, under Nebraska, Kansas and Missouri.



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† **Iowa**—BA 4/13—U.S. Eng., 1709 Jackson St., Omaha, Neb., levee and channel alterations, Unit III, Little Sioux River, Monona Co., CIVENG-25-066-60-76, $400,000. CD 9/30.

† **Colo., Denver**—MA-1-AWCS TRAINERS—BA 4/14—U. S. Eng., 1709 Jackson St., Omaha 2, Neb., MA-1-AWCS trainers, Lowry Air Force Base, ENG-25-066-60-104. $200,000. CD 10/23.

▲† **Kansas**—BA On Or About 4/19—U. S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., levees and channels for Marais des Cygnes River and Wilson Creek; floodwalls and floodgates along Marais des Cygnes River; three pumping plants with electric motor driven pumps, metal bldg. enclosures, drainage structures, stone slope protection, surf. of levee crest, etc., Stage II, Ottawa. CIVENG-23-028-60-67. $2,500,000. Plans deposit $40. CD 9/29.

† **Mont., Glasgow**—ADMINISTRATION, etc.—BA 4/19—U.S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash., 1 story, 46x206 ft., masonry administration bldg. and 10,596 sq. ft. barracks, Glasgow Air Force Base, ENG-45-108-60-99, $500,000. Plans deposit $5. CD 9/9/58.

† **New Mexico-Colorado**—BA 4/21—Bureau Reclamation, Dpt. Interior, Denver Federal Center, Denver, Colo., 10 ft. diam. elliptical intake bulkhead and embedded metalwork for outlet works intake structure at Navajo dam, Colorado River Storage Project, DS-5292.

† **N. M., Sacramento Peak**—BA About 4/26—U. S. Eng., 2132 Central Ave. S.E., Albuquerque, road rehabilitation, approx. 8,250 lin. ft. perforated pipe underdrain, Sunspot, ENG-29-005-60-73. $400,000. Plans deposit $5. CD 1/27.

▲† **Colorado**—BA 4/26—Bureau Reclamation, Dpt. Interior, Collbran, earthwork, structures, Leon Creek and Park Creek Diversion Dams, and Leon-Park Feeder Canal, Collbran Project, Spec. DC 5293. CD 9/19/44.

▲† **Okla., Altus**—MISSILE LAUNCHING SITES—BA after 4/26—U.S. Eng., Box 61, Tulsa, nine WS 107A-1 operational bases, complexes 557-1 thru 557-9, each site incl. underground launch control center, underground missile silo, all process piping, utilities, storage magazine, double bit. and single bit. surf. access roads, parking areas, fencing, grading, drainage, Altus Air Force Base, ENG-34-066-60-32. Over $10,000,000. CD 1/29.

▲ **Missouri**—HOTEL, etc.—BA 5/5—State Park Bd., Rm. 1206, 100 E. Capital Ave., Jefferson City, lease and build to operate, resort type business hotel, cabbana, swimming pool and related work, Table Rock State Park, Stone Co. Over $1,000,000. CD 3/19/59.

▲ **Tex., Freeport**—BA 5/24—Office Saline Water, Dpt. Interior, Interior Bldg., 19th and C Sts., Wash. 25, D. C., long tube vertical multiple effect salt water distillation plant. $1,500,000. W. L. Badger Associates, 309 S. State St., Ann Arbor, Mich., engrs. CD 9/25.

BUILDINGS—BA

▲† **Mo., Knob Noster**—HOUSING—BA After 3/21—Base Procurement Office, Whiteman Air Force Base, Knob Noster, 504 family units Capehart Housing, Whiteman Air Force Base. Bids No. 23-606-60-35. Plans deposit $150. CD 3/2, under LB.

Colo., Denver—PLANT—BA 3/29—Continental Baking Co., 600 W. 12 Ave., 1 story, 100,000 sq. ft. bakery plant, $110,000. T. J. Moore, Jr. & Arthur H. Bush, 718 E. 6 St., archts. CD 6/26.

Colo., Colorado Springs—MEDICAL BLDG.—BA 3/30—Cascade Avenue Medical Building Corp., c/o Edward L. Bunts & F. L. Kelsey, archts., 21 E. Monument, 4 story, medical bldg. $425,000. Extended date. John E. Bunts, 26 E. Monument, structural engr. Marshall & Johnson, 280 S. Penn St., Denver, mechanical engrs. Fred R. Leffler, 26 E. Monument, electrical engr. CD 3/9.

Ark., Siloam Springs — DORMITORY — BA 4/1 — John Brown University Bd. Trustees, 3 story, 25,000 sq. ft. brick and blocks dormitory addn. $400,000. Paul Young Jr., McIlroy Bank Bldg., Fayetteville, archt. CD 7/3.

† **Mo., Springfield**—U.S. ARMY RESERVE MAINTENANCE SHOP—BA 4/7—U.S. Eng., 1800 Federal Office Bldg., Kansas City 6, Mo., U.S. Army Reserve Maintenance Shop, IFB-60-65.

† **N. M., Las Cruces**—BASE CHAPEL CENTER—BA 4/21—U.S. Eng., P.O. Box 1538, Albuquerque, 76x122 ft. chapel, 30x86 ft. classroom wing, 43x60 ft. classroom wing, 17x36 ft. misc. wing, White Sands Missile Range, ENG-29-005-60-77B. $400,000. Plans deposit $5. CD 3/14.

▲ **Wyo., Laramie** — DORMITORIES, etc. — BA 5/10 — University of Wyoming, Campus, two 400-unit men's dormitories and dining hall. $3,025,000. Extended date. Porter & Porter, 1009 E. Lincolnway, Cheyenne, archts. CD 2/16.

BUILDINGS—SLC

Ark., Clarksville—PLANT—Johnson County Industrial Development Corp., soon lets contract 1 story, 33,600 sq. ft., brick masonry mfg. plant. Over $150,000. Erhart, Eichenbaum, Rauch & Blass, 210 Chester St., Little Rock, archts.

▲ **Iowa, Council Bluffs**—HOSPITAL—Jennie Edmundson Memorial Hospital Bd., Oak and Pierce Sts., soon lets contract 4 story hospital. $2,838,000. Leo A. Daly Co., 8600 Indian Hills Dr., Omaha, Neb., archt. CD 1/6/58.

Mo., St. Louis County—CHURCH, etc.—St. Lawrence the Martyr Catholic Parish, c/o Archdiocesan Bldg. Comn., 4396 Lindell Blvd., St. Louis, Zone 8, soon lets contract 1 story, T-shaped, 51x133 ft., and 59x230 ft., brick, masonry blocks, steel, concrete church and parochial school, Dupage Dr. and Woodford Way in Bridgeton-Carrollton Subdivision. Robert G. McMahon, 9216 Clayton Rd., Ladue, Zone 24, archt.

▲ **Mo., Warrensburg**—DORMITORIES—Central Missouri State College, soon lets contract two dormitories: 5 story, rein.-con., face brick, T-shaped, 65,892 sq. ft., part. air-conditioned men's dormitory; 4 story, 17,064 sq. ft. women's addn. to Todd Hall. $1,165,000. Conrad & Mantel, 4149 Penn, Kansas City, Mo., archts. CD 9/9.

HEAVY CONSTRUCTION—LB & CA

Sornsin Constr. Co., 116 Roberts, Fargo, N. D., CA **$209,383**, 17,878 lin. ft. storm sewer mains, 1,120 lin. ft. sanitary sewers, CROOKSTON, MINN. City, City Hall, Crookston, Minn. Bids Feb. 9. CD 1/13.

Judd Brown Constr. Co., Mankato, Minn., LB **$103,776**, sand-grav. subbase, grav. base and road-mixed bit. surf. 5½ mi. between CSAH 13, ½ mi. south of Cleveland and south line of county, CSAH 15; 3 mi. between south line of county and south limits of Kasota, CSAH 21, LECENTER, MINN. LeSueur Co., County Court House, LeCenter, Minn. Bids Feb. 9. CD 1/20.

▲ **IOWA**—State Hy. Comn., Ames, Bids opened 3/8,

Iowa—**Booth & Olson, Inc.**, 529 Ins. Exch. Bldg., Sioux City, Iowa, LB **$271,953**, c. conc. 0.797 mi. U-200 (15), Black Hawk Co.; LB **$152,994**, c. conc. 1.412 mi. U-1091(3), Black Hawk Co.; LB **$243,241**, c. conc. 2.771 mi. U-1101(1), Black Hawk Co.; LB **$90,457**, c. conc. 2.557 mi. SN-182, Wapello Co.; LB **$97,515**, c. conc. 2.92 mi. SN-183, Wapello Co.; LB **$100,816**, grading 6.238 mi. F-383(3), Ringgold and Taylor Counties; LB **$102,906**, grading 6.752 mi. F-451(6), Ringgold and Taylor Counties;

Iowa—**Western Eng. Co.**, Harlan, Iowa, LB **$119,473**, b. conc. 8.006 mi. SN-229, Cerro Gordo Co.; LB **$230,821**, b. conc. 10.053 mi. CO-1960-1-2-21, Hamilton Co.; LB **$115,495**, b. conc. 5.067 mi. S-579(3), Hamilton Co.; LB **$100,369**, b. conc. 5.024 mi. SN-140, Hancock Co.; LB **$114,640**, b. conc. 5.728 mi. SN-676, Hancock Co.;

Iowa—**Morgan Constr. Co., Inc.**, 522 South 22 St., Fort Dodge, Iowa, LB **$109,560**, b. conc. 4.721 mi. S-309(6), Humboldt Co.; LB **$128,189**, b. conc. 4.566 mi. T-197(10), Wright Co.; LB **$156,800**, b. conc. 6.056 mi. T-1219(10), Wright Co.; LB **$141,054**, b. conc. 5.992 mi. S-444(3), Wright Co.; LB **$326,364**, b. conc. resurf. 13.494 mi. FN-1053, Crawford Co.;

Iowa—**Concrete Materials & Constr. Co.**, P.O. Box 790, Cedar Rapids, Iowa, LB **$97,379**, b. conc. 2.729 mi. T-39-60, Marshall Co.; LB **$154,040**, b. conc. 4.835 mi. S-830(3), Marshall Co.;

Iowa—**Greene Limestone Co.**, Green, Iowa, LB **$94,457**, b. conc. resurf. 5.60 mi. F-41(14), Floyd Co.; LB **$96,275**, b. conc. resurf. 4.816 mi. F-279(3), Floyd Co.;

Iowa—**Brower Constr. Co.**, 2220 Hawkeye Dr., Sioux City, Iowa, LB **$133,567**, b. conc. resurf. 6.006 mi. F-342(23), Sioux Co.; LB **$113,516**, b. conc. resurf. 5.857 mi. FN-159, Wapello Co.;

Iowa—**Iowa Road Bldg. Co.**, 109 North-North Ave., Fairmont, Minn., LB **$105,496**, rolled stone base and bit. surf. 6.078 mi. B-160, Delaware Co.; LB **$94,643**, rolled stone base and bit. surf. 5.467 mi. SN-1099, Delaware Co.;

Iowa—**E. M. Duesenberg, Inc.**, P.O. Box 1188, Mason City, Iowa, LB **$254,915**, c. conc. 8.697 mi. S-866 (3), Calhoun Co.;

Iowa—**Fred Carlson Co.**, Highway No. 9 East, Decorah, Iowa, LB **$488,438**, c. conc. 10.318 mi. F-934(3), Delaware Co.;

Iowa—**Hallett Constr. Co.**, Boone, Iowa, and Crosby, Minn., LB **$147,130**, c. conc. 5.084 mi. S-853(3), Greene Co.;

Iowa—**Central Constr. Co.**, 108 East Boston, Indianola, Iowa, LB **$147,376**, c. conc. 4.034 mi. S-2195(2), Warren Co.;

Iowa—**Boswell Constr. Co.**, 218 Ins. Exch. Bldg., Sioux City, Iowa, LB **$104,885**, c. conc. and wid'n. 0.688 mi. FN-241, Clarke Co.;

Iowa—**Mauer Constr. Co.**, Sac City, Iowa, LB **$166,989**, b. conc. 7.04 mi. S-453(5), Buena Vista Co.;

Iowa—**Everds Bros.**, P.O. Box 374, Algona, Iowa, LB **$135,169**, b. conc. 8.913 mi. SN-2334, Kossuth Co.;

Iowa—**Hargrave Constr. Co.**, 2424 Bever Ave. S.E., Cedar Rapids, Iowa, LB **$294,653**, b. conc. resurf. 15.965 mi., FN-57, Cedar Co.;

Iowa—**Highway Surfacers, Inc.**, New Hampton, Iowa, LB **$182,575**, b. conc. resurf. 7.596 mi., F-287(2), Crawford Co.;

Iowa—**Norris Constr. Co.**, 311 South Wapello St., Ottumwa, Iowa, LB **$326,327**, b. conc. resurf. 15.632 mi. FN-1133, Koekuk and Mahaska Counties;

Iowa—**Weaver Constr. Co.**, Iowa Falls, Iowa, LB **$91,301**, rolled stone base and bit. surf. 5.102 mi. S-2731(3), Cedar Co. CD 2/26.

IOWA—State Hy. Comn., Ames, Bids opened 3/8,

United Contractors, Inc., 723 Ins. Exch. Bldg., Des Moines, Iowa, LB **$103,871**, bridges and culverts, SN-1657, Appanoose Co. CD 2/26.

† **Iowa Bridge Co.**, P.O. Box 7, Highland Park Station, Des Moines, Iowa, LB **$181,711**, est. $184,428, (10 bidders), C. & N. W. Railroad Bridge No. 1368, Unit IV, near Turin, Little Sioux River, CIVENG-25-066-60-58, IOWA. U. S. Eng., 1709 Jackson St., Omaha, Neb. Bids Mar. 8. CD 2/5.

Jax Constr. Co., Box 1587, Jackson, Tenn., CA **$418,537**, (11 bidders), rural electric transmission line: 36.0 mi. H-frame 69 kv line, 3-69-7.5/13.0 kv substations, West Plains, Howell and Oregon, MISSOURI. Howell-Oregon Electric Cooperative, West Plains, Mo. Bids Feb. 26, awarded Mar. 2. CD 2/9.

Hedges Constr. Co., 409 N. Lexington St., Springfield, Mo., CA **$109,235**, est. $128,350, sewerage sys. imprvs., incl. Sect. 1, oxidation basins and Sec. 3, sanitary sewerage sys., DREXEL, MO. City, City Hall, Drexel, Mo. Bids Feb. 18. CD 2/1.

H. J. Braun, Jr. Excavating Co., 2646 Creve Coeur Dr., St. Louis 17, Mo., LB **$215,517**, water sys. imprvs., incl. 45,903 lin. ft. 2- to 8-in. distr. lines, Sect. 1, FESTUS, MO. City, City Hall, Festus, Mo. Bids Mar. 2. CD 2/17.

E Buddemeyer, 7027 Woodrow Ave., Normandy 20, Mo., LB **$94,996**, Dellwood Park Development, incl. grading, sewers, water lines, paving, etc. in recreation area, Schuessler Rd., ST. LOUIS COUNTY, MO. St. Louis County Bd. P. Wks., Courthouse, Clayton 5, Mo. Bids Mar. 3. CD 8/14/44.

Olympus, Inc., Box 129, Independence, Mo., LB **$97,600**, sanitary sewerage sys., incl. 18,504 lin. ft. 8- to 10-in. sewer lines, 72 manholes, 2 lift stations, etc., SARCOXIE, MO. City, City Hall, Sarcoxie, Mo. Allgeier, Martin & Assocs., 1204 Main St. and P.O. Box 0, Station A, Joplin, Mo., engrs. CD 7/9/59.

Talon Constr. Co., Texarkana, Tex., CA **$229,986**, sewerage system imprvs., Sect. 1, inlet facilities, etc. and sewage treatment plant addn., ROGERS, ARK. City, Bd. Sewer Comrs., City Hall, Rogers, Ark., Bids Feb. 24, CD 2/8;
Forsgren Brothers, 3023 N 23 St., Fort Smith, Ark., CA **$143,328**, Sect 2, 22,478 lin. ft. 10- to 24-in. outfall sewers and 4,890 lin. ft. 8 in. c.i. force main, (Rogers, Ark.).

SOUTH DAKOTA—State Hy. Dpt., Pierre,
cancelled bids to have been opened Apr. 7, grading 5.373 mi. S 8930 (1) Dewey Co.; grading and subbase U.S. 83 F 03301 (3), Lyman Co.; signing and slope protection and guard rail I 29 I-29 3 (4) 76, and U-29-2 (8) 62, Minnehaha and Lincoln Counties. CD 3/9.

SOUTH DAKOTA—State Hy. Dpt., Pierre,
cancelled bids to have been opened Apr. 7, structures U. 83, No. of U.S. 16, F 033-1 (3), Lyman Co. CD 3/9.

† **General Electric Co.**, 610 Electric Bldg., Omaha, Neb., LB **$461,892**, (6 bidders), furnishing switchguard structures and appurtenances, near Pierre Oahe Reservoir Project, CIVENG-25-066-60-56, SOUTH DAKOTA. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Mar. 9. CD 2/1.

† **H. Halverson, Inc.**, 11 No. 5th, Grand Forks, N. D., LB **$663,592**, est. $692,265, (8 bidders), G. M. Assembly and Technical Supply Bldg., Ellsworth Air Force Base, ENG-25-066-60-83, RAPID CITY, S. D. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids March 10. CD 2/15.

M. J. Lee Constr. Co., McAlester, Okla., CA **$300,467**, sanitary sewer, lift station, BARTLESVILLE, OKLA. City, City Hall, Bartlesville, Okla. Bids Feb. 9. CD 1/26.

Boyd Callan Constr. Co., P.O. Box 3146, Waco, Tex., LB **$278,620**, floodwater retarding structure, 403,570 cu. yd. embankment, 183,000 cu. yd. common excav., 90,610 cu. yd. rock excav., etc., Inv. No. 7, Lampasas, TEXAS. Lampasas County Water Control & Imprvt. Dist. No. 1, c/o John T. Higgins, Lampasas, Tex. Bids Feb. 25. CD 2/2.

Brazos Electric Power Co-operative, Waco, Tex., Owner Builds, **$125,000**, 15 mi. 69 tv transmission line; **$135,000**, electric sub-station, Waco area, McLennan Co., TEXAS. CD 1/21.

▲ **Pipe Line Technologists, Inc.**, 3431 W. Alabama St., Houston, Tex., CA design and construct, 180 mi. pipeline from Seadrift Tex to King Ranch Gas Plant, Ella, TEXAS, Seadrift Pipeline Corp., sub Union Carbide Corp., 30 E. 42nd St., New York, N. Y.

Telephones, Inc., 2501 Cedar Springs Rd., Dallas, Tex., Owner Builds, **$118,000**, rural pole lines, La Junta, Wise and Parker Counties; **$125,000**, rural lines, Wichita Falls area, Wichita Co., TEXAS. CD 12/17.

TEXAS—State Hy. Comn., Austin, Tex., cancelled bids to have been opened March 15, grading, structures, base, surf. 7.063 mi. Hy. IH 10 Proj. I 10-4 (14) 594. Bexar Co., CD 2/18.

† **Officer in Charge of Constr.**, Naval Air Advanced Training Command, Bldg., 141, Naval Air Station, Corpus Christi, Tex., cancelled bids to have been opened Feb. 2, replace heating and air conditioning sys. in Quarters "A" Naval Air Station, Contr. No. Nby 28709 Spec. No. 28709/60 CORPUS CHRISTI, TEX., Est. under $25,00., CD 1/13.

▲ **Sira & Payne Contrs.**, Lawson-Cartwright Rd., Dallas, Tex., LB **$1,675,725**, est. $1,876,000, (14 bidders), Lake June Pump Station on Lake June Rd., DALLAS, TEX. City, City Hall, Dallas, Tex. CD 2/24.

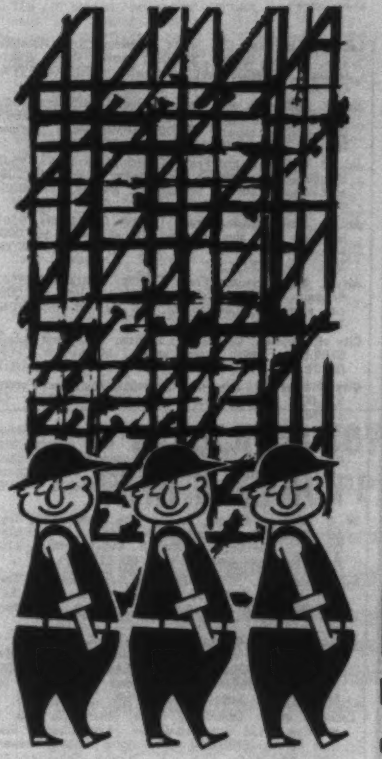
Bushman Constr. Co., 3706 Broadway, Kansas City, Mo., CA **$597,911.**, apron OPERATIONAL STRIPS, Inv. ENG 41-243-60-13, ELLINGTON AIR FORCE BASE, TEX., U. S. Eng. PO Box 1229, Galveston, Tex., (Correction-contractor) CD 3/4.

▲ **Claude Everett Constr Co.**, 2712 Danville St., P.O. Box 25082, Houston, Tex., CA **$1,237,882**, BULK MATERIALS HANDLING PLANT UNIT, HOUSTON, TEX. Harris County Houston Ship Channel Navigation Dist., 1519 Capitol Ave., Houston, Tex. Bids Feb. 24. CD 3/1, under LB.

Fed-Mart Corp., 4326 Blanco Rd., San Antonio, Tex., Separate Contracts, **$95,000.**, asphalt-paved area and auto center, HOUSTON, TEX. DeVerne Reed Kittle, 402 Blanco Rd., San Antonio, archt. CD 3/14.

Lakewood Building Co., 4034 Grapevine Rd., Houston, Tex., Owner Builds, **$105,000**, asphalt-paved streets, curbs and gutters, in Woodforest Subdivision, HOUSTON, TEX. CD 3/4.

Lakewood Building Co., 4034 Grapevine Rd., Houston, Tex., Owner Builds, **$100,000**, sanitary sewers; **$90,000**, storm sewers, in Woodforest Subdivision, HOUSTON, TEX. CD 3/4.



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Lakewood Building Co., 4034 Grapevine Rd., Houston, Tex., Owner Builds, **$62,000**, water lines, appurtenances, in Woodforest Subdivision, HOUSTON, TEX. CD 3/4.

Jas. E. McDaniels and Frank Thielen, Contractors, 9507 Braeburn Glen, Houston, Tex., Owner Builds, **$100,000**, sanitary sewers; **$95,000**, storm sewers, Sheldon Rd. and Hy. 90, HOUSTON, TEX. CD 3/10.

Jas. E. McDaniels and Frank Thielen, Contractors, 9507 Braeburn Glen, Houston, Tex., Owner Builds, **$98,500**, asphalt-paved streets, Sheldon Rd. and Hy. 90, HOUSTON, TEX. CD 3/9.

Jas. E. McDaniels and Frank Thielen, Contractors, 9507 Braeburn Glen, Houston, Tex., Owner Builds, **$63,000**, water lines, Sheldon Rd. and Hy. 90, HOUSTON, TEX. CD 3/9.

Jas. E. McDaniels and Frank Thielen, Contractors, 9507 Braeburn Glen, Houston, Tex., Owner Builds, **$63,000**, site earthwork, Sheldon Rd. and Hy. 90, HOUSTON, TEX. CD 3/9.

City of Longview, City Hall, Longview, Tex., Own Forces, **$100,000**, addnl. storm sewers, LONGVIEW, TEX. CD 10/28.

City of Longview, City Hall, Longview, Tex., Own Forces, **$70,000**, water lateral lines, LONGVIEW, TEX. CD 10/28.

Officer in Charge of Constr. Bldg., No. 2705, Naval Auxiliary Air Station, Kingsville, Tex., rejected bids Feb. 26, repair spalled areas concrete airfield pavement, the Naval Auxiliary Landing Field, Contr. NBy-26030 Spec. No. 26030/59 ORANGE GROVE, TEX., Est. **$10,000**. CD 2/11.

W. D. Ferguson & Sons, PO Box 446, Brownsville, Tex., LB **$101,100.**, border station, ROMA, TEX., Starr County Bridge Co., c/o Wm. H. Dukes, archts., 1102 Basse Rd., San Antonio, Tex., CD 12/4/59.

City Water Bd., 506 Dolorosa St., San Antonio, Tex., Own Forces, **$125,000.**, replace water mains SAN ANTONIO, TEX. Bruce Sasse, Ch. Eng. of Owners. CD 6/28/56.

Lackland Water Control & Imprv. Dist. c/o Geo. T. Manning, 6036 San Pedro Ave., San Antonio, Tex., Own Forces, **$110,000.**, water lines, SAN ANTONIO, TEX., R. Marvin Shipman, 202 Olmos Dr West, San Antonio, Tex., engr., CD 10/8/59.

Lackland Water Control & Imprv. Dist., c/o Geo. T. Manning, 6936 San Pedro Ave., San Antonio, Tex., Own Forces, **$100,000**, open storm drainage sewers, SAN ANTONIO, TEX., R. Marvin Shipman, 202 Olmos Dr. West, San Antonio, engr., CD 10/8/59.

City of Seguin, City Hall, Seguin, Tex., Owner Builds, **$96,750**, PARKS, SEGUIN, TEX. CD 12/3/57.

Garton Utilities, 1000 E. 15 St., Cheyenne, Wyo., CA **$135,767**, boiler system expansion, Contr. 2A, approx. 6,600 ft. walk-in. type tunnels, LARAMIE, WYO., University of Wyoming, Campus, Laramie, Wyo. Bids March 4. awarded March 7. Grand Total **$524,332**. CD 2/9;
Simpson Elec. Inc., 920 E. 15 St., Cheyenne, Wyo., CA **$105,698** Contr. 2B, furnishing and installing electrical distribution cables (Laramie, Wyo.).
L. M. Marcum, Marshall, Iowa, CA **$282,867**, Contr. 2C furnishing and installing steam distribution piping and insulation, (Laramie, Wyo.).

† **Cunningham Constr. Co.**, P. O. Box 1109, El Paso, Tex., CA **$68,517**, earthfill retarding structure and appurtenances, Site No. 2, Peter's Lake, Zuber Draw Watershed, Chaves Co., for Soil Conservation Service, NEW MEXICO. Zuber Watershed Dist., First National Bank Bldg., Hagerman, N. M., Bids Feb. 4. CD 1/27.

BUILDINGS—LB & CA

Joseph H. White & Son Development Corp., 1695 S. Brentwood Bldg., Brentwood 17, Mo., CA Est. over **$600,000**, 1 story, bsmnt., 42,000 sq. ft. DEPARTMENT STORE, incl. parking areas, Town & Country Shopping Center, Woodsen Rd., OVERLAND (ST. LOUIS 14, P. O.), MO. Thomas J. White Development Co., 1695 S. Brentwood Blvd., Brentwood 17, Mo. J. C. Penney Co., 10 S. Brentwood Bldg., Brentwood 17, Mo., lessee. CD 5/7.

Kelley-Nelson Constr. Co., Gazette Bldg., Little Rock, Ark., CA **$600,000**, 1 story, 90,000 sq. ft. concrete steel tilt-up PLANT for fractional horsepower motors, office section, BRINKLEY, ARK. Brinkley Industrial Development, c/o Bank of Brinkley, Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 35, Mo., lessee. CD 3/10.

† **Robert E. McKee, General Contractor, Inc.**, P.O. Box 562, El Paso, Tex., LB **$810,900**, 11 BARRACKS, 1 MESS HALL, Fort Bliss, Inv. No. ENG-29-005-60-60, EL PASO, TEX. U. S. Eng., Box 1538, Albuquerque, N. M. CD 2/4.

▲ **Catalytic Constr. Co.**, 1528 Walnut St., Phila., Pa., CA Est. **$6,000,000**, vinyl chloride monomer PLANT on Ship Channel, HOUSTON, TEX. Ethyl Corp., 3910 W. Alabama St., Houston, Tex. CD 2/18.

Hallmark Homes, 3689 Del Monte St., Houston, Tex., Owner Builds, **$439,750.**, 38 DWELLINGS in Channelview, HOUSTON, TEX., CD 1/21.

▲ **T. D. Howe Constr. Co.**, P. O. Box 19027, Houston, Tex., LB **$1,118,000**, (Base Bid), SHOPPING CENTER, CD 2/19; LB **$96,619**, shop area pavement and auto center, CD 11/27/59; LB **$63,315**, site earthwork, CD 11/27/59, on S. Port Oak Rd., HOUSTON, TEX. The Meyerland Co., 4703 Jason St., Houston, Tex., Bids Feb. 24.

▲ **Jaffe & Martin**, 4623 Blanco Rd., San Antonio, Tex., CA **$1,100,000**, 100,000 sq. ft. STORE job No. 1, Wirtz, near Hempstead Rd., HOUSTON, TEX. Fed-Mart Corp., 4326 Blanco Rd., San Antonio, Tex., CD 3/14.

Lakewood Building Co., 4034 Grapevine Rd., Houston, Tex., Separate Contracts, **$431,000.**, 23 DWELLINGS, **$422,250.**, 20 DWELLINGS in South Glen Subdivision, off Almeda-Genoa roads, HOUSTON, TEX., CD 3/2.

Rozelle Constr. Co., 4034 Grapevine Rd., Houston, Tex., Own Forces, **$405,000**, 19 DWELLINGS, HOUSTON, TEX. CD 1/13.

▲ **O. L. Olsen Co., Inc.**, 416 Pierce St., Houston, Tex., CA **$1,150,000**, PROCESSING PLANT ADDN., near ROCKPORT, TEX. Bay Petroleum Co., (Div. of Tennessee Gas Transmission Co.) Tennessee Bldg., Houston, Tex. CD 3/11.

Robert Morehead, c/o Preston Forest Shopping Center, and Lloyd Baxter, 4165 Meadowdale St., Dallas, Tex. Owner Builds, **$825,000.**, "La Dauphine" APARTMENT, No. 2, SAN ANTONIO, TEX. John E. Taylor, 3747 McMillan St., Dallas, Tex., archt., CD 2/26/60.

▲ **Mellwin Constr. Co., Inc.**, 35 S. Fox, Denver, Colo., CA **$5,000,000**, All Seasons CLUB-HOTEL, with ski lift, 18-hole golf course, year around outdoor ice skating rink, heated swimming pool and tennis courts, BUFORD, COLO. All Seasons Club, c/o Elliott Roosevelt, Buford, Colo. Lawrence Hughes, Palm Springs, Calif., archt. for golf course, Hirman Hudson, Benedict, 335 N. Marshall Ave., Scottsdale, Ariz., archt for hotel.

FAR WEST

HEAVY CONSTRUCTION—BA

▲ **Wash., Spokane**—BA 3/31—City, City Hall, 8 in.-66 in. concrete interceptor sewers 6.38 mi., Northwest section, Cannon Hill, Post St. and Hollywood. $1,000,000. Plans deposit $50. A. M. Eschbach, c/o owner, city engr. CD 1/19.

▲ **Calif., Los Angeles**—BA 4/1—Los Angeles County Flood Control Dist., 2250 Alcazar St., Storm Drain Project No. 519, Proj. 407 Line C, Proj. 423 Lines A&B, Proj. 589 Line A, Baldwin Park, Covina, West Covina. $1,500,000. CD 11/10/58.

▲ **Calif., Redondo Beach** — HARBOR DEVELOPMENT — BA 4/4—City, City Hall, harbor, 1st phase, Part 1. $3,400,000. Koebig & Koebig, 3242 W. 8 St., Los Angeles 5, Calif., engrs. CD 4/22, under Earthwork.

† **WASHINGTON**—BA 4/5—U. S. Forest Service, 729 N. E Oregon St., Portland, Ore.,
Clallam Co.—237 ft., rein.-con. bridge over south fork Calawah River on Leyh Creek Rd. No. 2827 in Olympic National Forest, Inv. R6-60-236.

▲ **Calif., Long Beach**—BULK GRAIN TERMINAL—BA 4/6—Long Beach Harbor Department, 1333 Embarcadero, P.O. Box 570, bulk grain terminal, Pier A, Berth 211. $2,500,000. CD 2/5/58.

† **Oregon**—BA 4/12—U. S. Eng., Pittock Block, Portland, two 17,250 hp. hydraulics turbines, Cougar Reservoir, CIVENG-35-026-60-135. Extended date. CD 2/25.

† **Idaho**—BA 4/13—U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash., clearing, grubbing and placing gravel fill and rock riprap along Pend Oreille River at Albeni Falls reservoir, CIVENG-45-108-60-27.

† **California**—BA 4/28—U. S. Eng., 1200 8th St., Sacramento, relocation of County Road No. 804 near Valley Springs, 32 mi. east of Stockton for New Hogan Dam Project, Calaveras Co., ENG-04-167-60-49. $600,000. Plans deposit $5. CD 9/15.

BUILDINGS—BA

▲ **Alaska, Anchorage**—PUBLIC SAFETY BLDG.—BA 4/4—City, P.O. Box 400, 50,000 sq. ft. steel, concrete public safety. $1,450,000. Plans deposit $50. Edwin Crittenden & Assocs., 835 Ninth Ave., Anchorage, Alaska, archts. CD 11/27.

Calif., San Jose—REMODEL INDUSTRIAL ARTS AREA, etc.—BA 4/5—State Div. Architecture, 1120 N St., Sacramento, remodel industrial arts area for corporation yards, Phase II, San Jose State College. W. O. 4160GC-53. $120,000. Plans deposit $25. CD 12/4/58.

Calif., Santa Rosa—DORMITORY, etc.—BA 4/5—State Div. Architecture, Rm. 172, P. Wks. Bldg., 1120 N St., Sacramento, rein.-con., concrete block, 9,000 sq. ft. dormitory, home econ. bldg., alterations and addns. of two bldgs., Los Guilucos School for Girls, near here. $475,000. Plans deposit $50. CD 7/24/57.

† **Hawaii, Oahu**—STALL FIRE STATIONS—BA 4/6—U. S. Eng., Fort Armstrong, Honolulu, three stall fire stations at Fort Shafter, ENG-94-612-60-178.

▲ **Calif., San Jose**—COUNTY OFFICE—BA 4/14—Bd. Supervs. Santa Clara Co., 20 W. Rosa St., 4 story, 85,000 sq. ft. rein.-con. and steel frame county office, Palo Alto. $1,500,000. Plans deposit $65. Paul James Huston, 744 Cowper St., Palo Alto, Calif., archt. CD 1/5.

BUILDINGS—SLC

▲ **Calif., Riverside**—HEALTH BLDG.—Riverside County, Courthouse, soon lets contract 5 story rein.-con. health bldg. $1,500,000. CD 3/7.

▲ **Calif., San Leandro**—HOSPITAL—East Bay Lutheran Hospital Assn., 1332 E. 14th St., soon lets contract 4 story, 62,000 sq. ft. rein.-con. San Leandro Memorial Hospital, MacArthur Blvd. and Benedict Dr. Over $2,000,000. Plans deposit $75. Stone, Marraccini & Patterson, 536 Mission St., San Francisco, Calif., archts.

HEAVY CONSTRUCTION—LB & CA

▲† **S. S. Mullen, Inc.**, 220 River St., Seattle, Wash., LB **$3,854,147**, (10 bidders), rearward communications facilities incl. composite bldgs., radio relay bldgs., covered walkways, fdns., outside utilities, roads and towers, Lena and Hoonah Point, Inv. 60-28, ALASKA. U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash. Bids Mar. 10. CD 2/29.

▲ **UTAH**—State Rd. Comn., State Capitol, Salt Lake City, Bids opened Mar. 8.

Morrison-Knudsen Co., 900 W. 15th W, Salt Lake City, Utah, LB **$1,392,390**, est. $1,475,293, grading and drain FAP No. I-15-6 (5), Utah Co. CD 2/17.

UTAH—State Rd. Comn., State Capitol,

L. A. Young Constr., 343 S. State, Salt Lake City, Utah, CA **$650,547**, est. $830,000, b. conc. surf. 4.399 mi. Proj. F-15-7 (25) 311 3rd Contr. Davis Co. Bids Feb. 16. CD 2/23, under LB.

† **S. A. des Ateliers de Secheron, Geneva, Switzerland,** LB **$193,677** (12 bidders), one 105,000 kva power transformer for generator Unit N-8, Hoover Power Plant, Boulder Canyon Project, DS 5271, ARIZONA and NEVADA, Bureau Reclamation, Dpt. Interior, Bldg. 1-A, Denver Federal Center, Denver, Colo. Bids Mar. 8. CD 1/22.

Lord Bros. Constr. Co., 9233 N. Calvert St., Portland, Ore., CA **$623,032**, 4,000 ft. 48 in. diam., rein.-con. lined tunnel for Summit Ave. Intercepter Sewer, EVERETT, WASH. City, City Hall, Everett, Wash. Bids Mar. 2. CD 3/8, under LB.

† **Compudyne Corp.**, 400 S. Warminster Rd., Hatboro, Pa., LB **$68,418** (3 bidders), fishway automatic control equipment for Ilc Harbor Dam, Walla Walla and Franklin Counties, CIVENG-45-164-60-29, WASHINGTON. U.S. Eng., City-County Airport, Walla Walla, Wash. Bids Mar. 8. CD 2/9.

Pittsburgh-Des Moines Steel Co., 500 Wall St., Seattle, Wash., CA **$56,450** (5 bidders), 1.8 m.g. steel water reservoir, MOUNTLAKE TERRACE, WASH. City, City Hall, Mountlake Terrace, Wash. Bids Mar. 7. CD 2/25.

▲ **OREGON**—State Hy. Comn., Highway Bldg., Salem, Ore.—**Roy L. Houck Sons**, 1585 N. 20th St., Salem, Ore. CA **$725,392**, grading 3.35 mi., 3 concrete structures, Evans Creek-Homestead Section, Pacific Hy., Proj. FAIHP I-5-1 (8) 46, Jackson Co.; CA **$794,219**, grading 2.7 mi., 3 concrete structures, Homestead-Rock Point section, Pacific Hy., Proj. FAIHP I-5-1 (19) 44, Jackson Co.;

Ore.—**Keystone Constr. Co.**, Box 55, Prineville, Ore. CA **$1,560,015**, grading 9.99 mi. Baker-Pleasant Valley section, Old Oregon Trail Hy., Proj. FAIHP I-80N-7 (1) 306, Baker Co.;

Ore.—**Warren Northwest**, Box 5072, Portland, Ore., CA **$786,976**, paving, signing 9.78 mi. Lancaster Dr., Sublimity Gun Club section North Santiam Hy., Proj. FAP S-265 (8) and S-220 (4), Marion Co. Grand total $3,866,602. Bids Mar. 1, awarded Mar. 10. CD 3/8, under LB.

OREGON—State Hy. Comn., Highway Bldg., Salem, rejected bids Mar. 1, Brothers-Gap Ranch rock production, Central Oregon Hy., Deschutes, Lake and Harney Counties. CD 2/24.

† **Bureau Reclamation**, Dpt. Interior, Regional Office, 2929 Fulton Ave., Sacramento, Calif., rejected bids Feb. 25 North Coast Proj., drilling and casing irrigation well, Round Valley Unit, near Covelo, Spec. 200C-444, CALIFORNIA. Will re-advertise about May 1, under Spec. No. 200C-444A. CD 2/9.

† **Electro Steel Structures**, Covina, Calif., LB **$199,413** (8 bidders), mobile instrumentation stations, incl. utilities, fencing, sewage, access roads, etc. Granite Canyon and Piedram Biancas, Monterey and San Luis Obispo Counties, NBy 25942, CALIFORNIA. Dist. P. Wks. Office, 12th Naval Dist., San Bruno, Calif.

Geo. Bianchi Constr., Inc., 1850 So. 7th St., San Jose, Calif., LB **$340,600** (8 bidders), barracks bldg., mess hall, 2 office bldgs., equip. bldg. and shop bldg., Alder Conservation Camp, Klamath, Del Norte Co. W.O. 4169GC-9, CALIFORNIA. State Div. Architecture, 1120 N St., Sacramento, Calif. Bids Mar. 8. CD 2/16.

Matt J. Zaich, 6828 Farmdale Ave., North Hollywood, Calif., LB **$867,616**, est. $1,000,000 (16 bidders), Whittier Storm Drain, lines A to H, Whittier, Proj. 590, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids Mar. 4. CD 2/9.

HAWAII—State Hy. Dpt., 869 Punchbowl St., Honolulu, Bids opened Mar. 3,

C. W. Vincent, Inc., 809 Ahua St., Honolulu, Hawaii, LB **$624,904** (5 bidders), Hana Belt Rd., Maliko Section, FAP No. F-036-1 (1), Island of Maui. Bids Mar. 10. CD 7/30.

BUILDINGS—LB & CA

▲† **Raber-Kief, Inc. and B-E-C-K Constructors**, 3647 Stoneway, Seattle 3, Wash., LB **$3,853,000**, electronic aids to navigation station at Sitkinak, St. Paul and Attu Islands and monitoring station at Adak, Inv. 18-60, ALASKA. P. Wks. Office, 17th Coast Guard Dist., Box 2631, Juneau, Alaska. Bids Mar. 8. CD 2/10;
American Service, Inc., Post Rd., Anchorage, Alaska, LB **$1,597,000**, navigation-aid station at Sitkinak (Alaska).

Alder-Child Constr., 250 E. 39 S., Salt Lake City, Utah, LB **$748,800**, Blanding HIGH SCHOOL, Blanding, MONTICELLO, UTAH. San Juan School Dist., Monticello, Utah. Bids Mar. 7. CD 2/19.

▲ **H. Halvorson, Inc.**, P.O. Box 6, Yardley, Wash., LB **$1,596,789** (9 bidders), general contract 2 MEN'S RESIDENCE HALLS and CENTRALIZED DINING FACILITIES, PULLMAN, WASH. Washington State University, Pullman, Wash. Bids Mar. 11. CD 2/17;
Lent's, Inc., 279 4 St., Bremerton, Wash., LB **$525,788** (10 bidders), mechanical contract, men's residence halls, etc. (Pullman, Wash.).

The Austin Co., 16112 Euclid St., Cleveland, O., CA Est. **$500,000**, design and constr. conversion of Boeing Field hangar to ELECTRONIC CENTER, SEATTLE, WASH. Boeing Airplane Co., 7755 E. Marginal Way, Seattle, Wash. CD 7/1.

W. C. Bensz Co., 6300 Seville Ave., Huntington Park, Calif., LB **$704,900** (6 bidders), frame, stucco MOTEL, incl. Swimming Pool, FRESNO, CALIF. Hawley & Assoc., c/o contractor.

▲ **Foster-Marsch Corp. & Manderbach Constr. Co.**, 3911 Pacific Hy., San Diego, Calif., LB **$5,997,000** (9 bidders), HOME FOR RETIRED, SAN DIEGO, CALIF. Pacific Homes Development Co., 5250 Santa Monica Blvd., Los Angeles, Calif. Bids Mar. 8. CD 3/2.

▲ **Nomellini Constr. Co.**, Stockton, Calif. and **Fruin-Colnin Contg. Co.**, Burlingame, Calif., LB **$4,689,000** (6 bidders), 354 unit Alice Griffith GARDEN HOMES, area of Candlestick Stadium, SAN FRANCISCO, CALIF. San Francisco Housing Auth., 440 Turk St., San Francisco, Calif. Bids Mar. 10. CD 2/15.

CANADA

BUILDINGS—BA

Que., Point Viau—HIGH SCHOOL—BA 3/29—The School Bd. of Point Viau, 50 Lahaie St., 2 and 3 story high school, Fortin St. $850,000. Crevier, Lemieux & Mercier, 1065 Pratt Ave., Outremont, archts. Pelletier & Forest, 506 St. Catherine St. E., Montreal, engrs.

▲ **Que., Sherbrooke**—FACTORY—BA 3/29—Walter M. Lowney Co. Ltd., 350 Inspector St., Montreal, (selected list of bidders), 418,000 sq. ft. rein.-con., steel frame, masonry, confectionery factory, cafeteria, office, east of Bourque Blvd. $5,000,000. T. Pringle & Son Ltd., 4795 St. Catherine St. E. Montreal, consult. engrs. CD 3/1.

BUILDINGS—SLC

Ont., Dresden—PLANT—Canadian Canners Ltd., 44 Hughson St. S., Hamilton, soon lets contract 35,000 sq. ft. plant addn. $175,000. D. N. McIntosh, C. H. Moeller, Assocs., 430 Whitney Ave., Hamilton, archts.-engrs. CD 4/27.

Que., Sherbrooke—SHOPPING CENTRE—King St. Shopping Centre, c/o Yale Enterprises Ltd., 1231 St. Catherine St. W., soon lets contract, 2 story, 115,000 sq. ft. shopping centre, King St. W., $750,000. Reuben Fisher, 3177 St. Sulpice Rd., Montreal, archt. Paul A. Archambault, 2125 Jean Talon St. E., Montreal, engr. CD 2/26.

HEAVY CONSTRUCTION—LB & CA

Greenlees Piledriving Co. Ltd., 630 Taylor St., Van-

RELOCATED TOWNS START RIGHT WITH D-O EQUIPPED SEWAGE PLANTS

Modern installations are provided for three communities moved by St. Lawrence Seaway project

Relocation of three Ontario communities, due to construction of dams for the St. Lawrence Seaway, made modern sewage treatment plants necessary. In each case, basic equipment was manufactured and supplied by our Canadian Associate, Dorr-Oliver-Long Ltd.

D-O is a foremost supplier of sewage and water treatment equipment to meet the needs of any type of plant. For details on the wide range of units available, write to Dorr-Oliver Inc., Stamford, Conn.

IROQUOIS, ONT.
Clarifier, 30′ dia. x 12′ SWD; Digester, 25′ dia. x 18′ SWD; Sludge Pump. Design population: 5,000. Design flow to plant: 600,000 GPD.

Consultants:
Proctor & Redfern, Toronto, Ontario.

MORRISBURG, ONT.
2 Clarifiers, primary type, 20′ square x 7′ SWD. Design population: 5,000. Design flow: average 600,000 GPD, Maximum 900,000 GPD.

Consultants:
James F. MacLaren & Associates, Toronto, Ontario.

LONG SAULT, ONT.
2 Clarifiers, primary and secondary, each 28′ dia. x 8′ 6″ SWD. Design population: 3,000. Design flow: average 360,000 GPD, maximum 605,000 GPD.

Consultants:
Marshall, Macklin & Monaghan, Don Mills, Ontario

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WORLD-WIDE RESEARCH • ENGINEERING • EQUIPMENT

CIRCLE 291 ON READER SERVICE CARD

couver, B. C., LB $302,569 (3 bidders) Contract No. 2, 1. B. II, ferry terminal, Swart Bay, BRITISH COLUMBIA. British Columbia Govt., Parliament Bldgs., Victoria, B. C. Swan, Wooster & Partners, 1334 W. Pender St., Vancouver, B. C., engrs.

BUILDINGS—LB & CA

▲ **John Laing & Sons Canada Ltd.**, Annacis Industrial Estates, New Westminster, B. C., CA Est. $1,500,000, AGGREGATE PLANT, CRUSHER BLDG., GRAVEL PLANT, SAND PLANT, LOADUP BLDG., 16,200 ft. conveyor belts, PITT RIVER, B. C. Evans, Coleman & Evans, ft. Columbia St., Vancouver, B. C. Bids Jan. 26, awarded Feb. 3. CD 12/9.

Bird Constr. Co. Ltd., Sargent and Erin St., Winnipeg, Man., CA $404,404, HEADQUARTERS and CITADEL, Colony St., WINNIPEG, MAN. Salvation Army, 20 Albert St., Toronto, Ont. George A. Stewart, 700 Riverwood Ave., Winnipeg, Man., archt. Awarded Mar. 4.

▲ **Associated Electrical Industries Ltd.**, 33 Grosvenor Pl., London, S. W. 1, London, England, CA steam turbine generator for CANDU NUCLEAR PLANT, Douglas Point, Lake Huron, KINCARDINE, ONT. Atomic Energy of Canada Ltd., Chalk River, Ont. and Ontario Hydro-Electric Power Comn., 620 University Ave., Toronto, Ont. CD 8/14/59.

Canadian General Electric Ltd., 214 Kingsway, Toronto, Ont., CA STATOR AND ROTOR (Kincardine, Ont.).

▲ **Globe Building Co. (Toronto) Ltd.**, 1654 Bathurst St., Toronto, Ont., CA Est. $10,000,000, four 15 story, steel frame, rein.-con. substructure, brick APARTMENTS, air conditioning, Walmer Rd. and St. Clair Ave. W., TORONTO, ONT. Heathmuir Investments Ltd., 1654 Bathurst St., Toronto, Ont. Mandel C. Sprachman, 33 Asquith Ave., Toronto, Ont., archt. Alex Tobias & Assocs. Ltd., 194 Wilson Ave., Toronto, Ont., engrs.

▲ **Byers Constr. Co. Ltd.**, 5675 Upper Lachine Rd., Montreal, Que., CA Est. $1,000,000, PLANT, Boyce St., MONTREAL, QUE. Coca-Cola Ltd., 90 Broadview Ave., Toronto, Ont. Bids Feb. 19, awarded Mar. 7. CD 2/9.

PROPOSED PROJECTS

SEWERS, WASTE DISPOSAL

Conn., Norwalk—First Taxing Dist., 3 Belden Ave., 2 m.g. water tank, Walter Ave. $100,000.

Ill., Thornton—Village, Village Hall, WW, 150,000 gal. tank, sewage treatment plant, $210,000.

Ind., Chrisney—Bd. Village Trustees, WW sys., Proj. No. PFL-IV-Ind.-85. $163,000. Bids soon. Paul J. Kleiser & Assocs., 673 Tippecanoe St., Terre Haute, engrs. CD 3/1.

▲ **N. C., Raleigh**—General Services Div., City Dpt. Admin., City Hall, voted bonds Feb. 23, water line extension, $1,360,000. CD 1/19.

▲ **N. C., Wilson**—City, City Hall, water treatment plant $700,000, 1 m.g. elevated steel storage tank $250,000, William C. Olson & Assocs., 5 Exchange Pl., consult. engrs.; cleaning, de-silting Wiggins Mill reservoir, $100,000; 98,400 lin. ft. 6- to 20-in. water lines, $720,000; water pumping stations, $75,000; water supply dam below Winstead Mill Dam, $75,000. CD 1/5.

O., Mansfield—City, City Hall, extending 30 in. water main from pumping station north on Alta Rd., 20 in. line from B & O R. R. and Park Ave. along tracks to Bowman St. Main, 20 in. main from Woodland reservoir along Cook Rd. to Main St. $575,000. George Cunitz, c/o owner, engr. Constr. in Summer.

Pa., Bristol—Bristol Water Dpt., Borough Hall, roll water intake plant, $100,000. William H. Boardman, 218 S. 4 St., Phila., consult. engr.

Pa., Bristol—James A. Coe Steel Co., Inc., foot of Tillman St., Raritan, N. J., waste treatment facilities, $200,000. Roy F. Weston, Inc., Newtown Square, consult. engr. for preliminary plans.

Tenn., Johnson City—City, City Hall, WW imprvs. $200,000. Howard K. Bell, 533 S. Limestone, Lexington, Ky., consult. engr. CD 3/28/52.

Tex., Marble Falls—Marble Falls W.C. & I.D. No. 1, water facilities (PFL-Tex-153), $400,000. Frank T. Drought, San Pedro at Woodlawn, San Antonio, consult. engr. CD 2/13/59.

Ont., Brampton—Ontario Water Resources Comn., East Block, Parliament Bldg., Toronto, WW, $267,000.

▲ **Ont., Hamilton**—City, City Hall, water mains, Mohawk Rd. $2,150,000.

Ont., North Bay—City, City Hall, Widdifield Twp., Maplewood Ave., Widdifield, water main exten. from reservoir to Widdifield Twp. $328,000.

Ont., Whitby—Consolidated Building Corp., Ltd., 99 Avenue Rd., Toronto, water filtration plant on residential development, Western Heights, Pickering Twp., east of here. $750,000. Proctor & Redfern, 75 Eglinton Ave. E., Toronto, consult. engrs.

SEWERS, WASTE DISPOSAL

Calif., Los Angeles—City, City Hall, sanitary sewers in Sharp Ave. and Alexander St. Sewer District. $149,390. CD 4/8/55.

Iowa, Farmington—Town, Town Hall, sewerage system, treatment olant, $190,000. Sherman, Smith & Assocs., Burlington, engrs. CD 2/12.

Iowa, Shell Rock—Town, Town Hall, sewage treatment plant and sewers. $292,865. Bids 1960. Lechner Engr. Co., Lechner Bldg., Ames, consult. engr.

▲ **Kan., Salina**—City, City Hall, (P-Kan-3020) sewer facilities. $1,434,650. Wilson & Co., 631 E. Crawford, consult. engrs.

Ky., Greensburg—City, City Hall, sewage disposal plant and sewer lines. $600,000. Kentucky Engineering Corp., 3804 Lexington Rd., Louisville, consult. engrs. Bids in April.

Minn., Zumbrota—Village, Village Hall, voted $425,000 bonds Feb. 11, sewers and treatment plant. CD 2/5.

Miss., New Houlka—Town, Town Hall, sewerage sys. $126,500. Leland B. Cook, 703 Crossover Rd., Tupelo, Miss., engr. CD 2/29.

Mo., Herman—City, City Hall, sewer facilities. $294,000. Russell & Axon, 408 Olive St., St. Louis 2, Mo., consult. engrs.

Mo., Seneca—City, City Hall, bond election Apr. 19, sewerage system, $292,000. CD 10/22.

▲ **N. J., Edison (Nixon P. O.)**—Edison Twp., Twp. Hall, trunk sewers in Mirror Lake, sewers and sewage plant, Menlo Park Sect., trunk and collecting sewers in Bonhamtown Sect. $2,350,000. Raymond P. Wilson Assocs., 46 Paterson St., New Brunswick, engrs. CD 2/9/59.

N. Y., Cheektowaga—Town of Cheektowaga, Broadway and Union, Cheektowaga, drainage district covering 400 acres remedial job for housing development using variable pipe. $565,729. Nussbaumer, Clarke & Velzey, Inc., 327 Franklin St., Buffalo, consult. engr.

N. C., Raleigh—City, City Hall, sanitary sewer outfalls, Walnut Creek, Over $100,000. Boney & Newcomb, 625 Tucker St., consult. engr. CD 3/7.

N. C., Raleigh—General Services Div., City Dpt. Admins., City Hall, voted bonds Feb. 23, extending sewer outfalls, $540,000. CD 1/19.

▲ **O., Cincinnati**—Bd. Comrs. Hamilton Co., Courthouse, approx. 25 mi. sanitary sewerage system, Taylor Creek, $11,000,000; sewage treatment plant, Taylor Creek, $500,000. Al LeFeber & Assocs., 2933 Woodburn St., consult. engrs. CD 11/29/57.

O., Dayton—Bd. Comrs. Montgomery Co., Courthouse, Sugar Creek Sewer Dist. Area 1, $141,845, Sugar Creek Sewer Dist. Area 2, $154,600.

O., Kirtland (Br. Willoughby)—Julian Quigley, 2180 Chillicothe Rd., Chesterland, plans by Damon, Worley & Samuels, Engineers Bldg., 45 ton per day incinerator, $135,000.

Tenn., Cleveland—City, City Hall, sanitary sewer imprvs. $575,000. J. R. Wauford & Co., P. O. Box 2081, Nashville, consult. engrs.

Tex., Henderson—City, City Hall, $237,000 bond election Apr. 5, sanitary sewer line extensions, $237,000.

Tex., Houston—Jas. E. McDaniels & Frank Thielen, Contractors, c/o 9507 Braeburn Glen, sanitary sewers, $100,000; storm sewers, $92,000, Sheldon Road and Hy. 90.

(Continued on page 296)

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EXPLOSIVES BAGS

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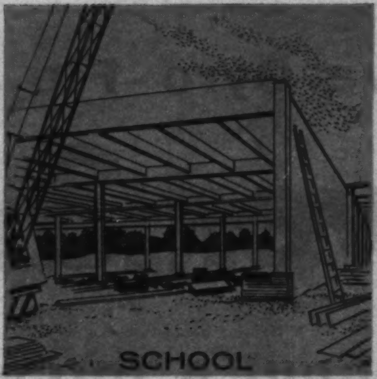
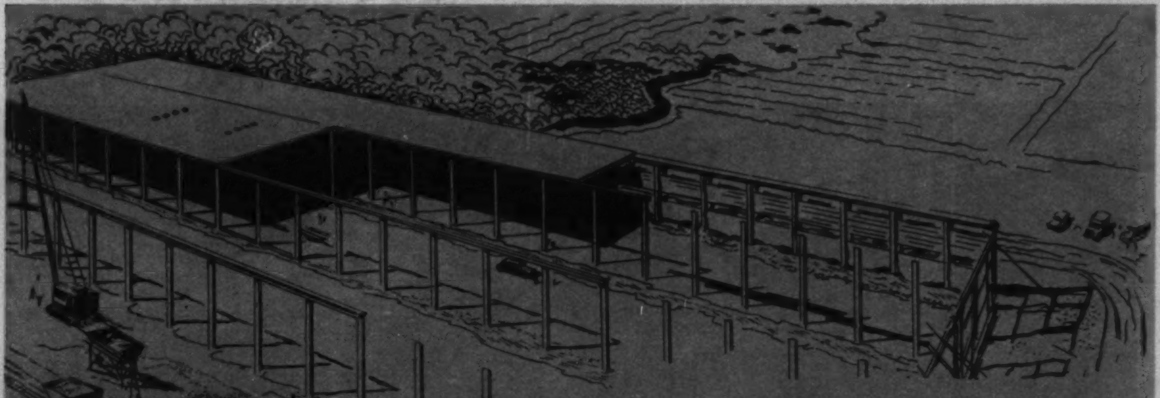


SCHOOL

AUDITORIUM



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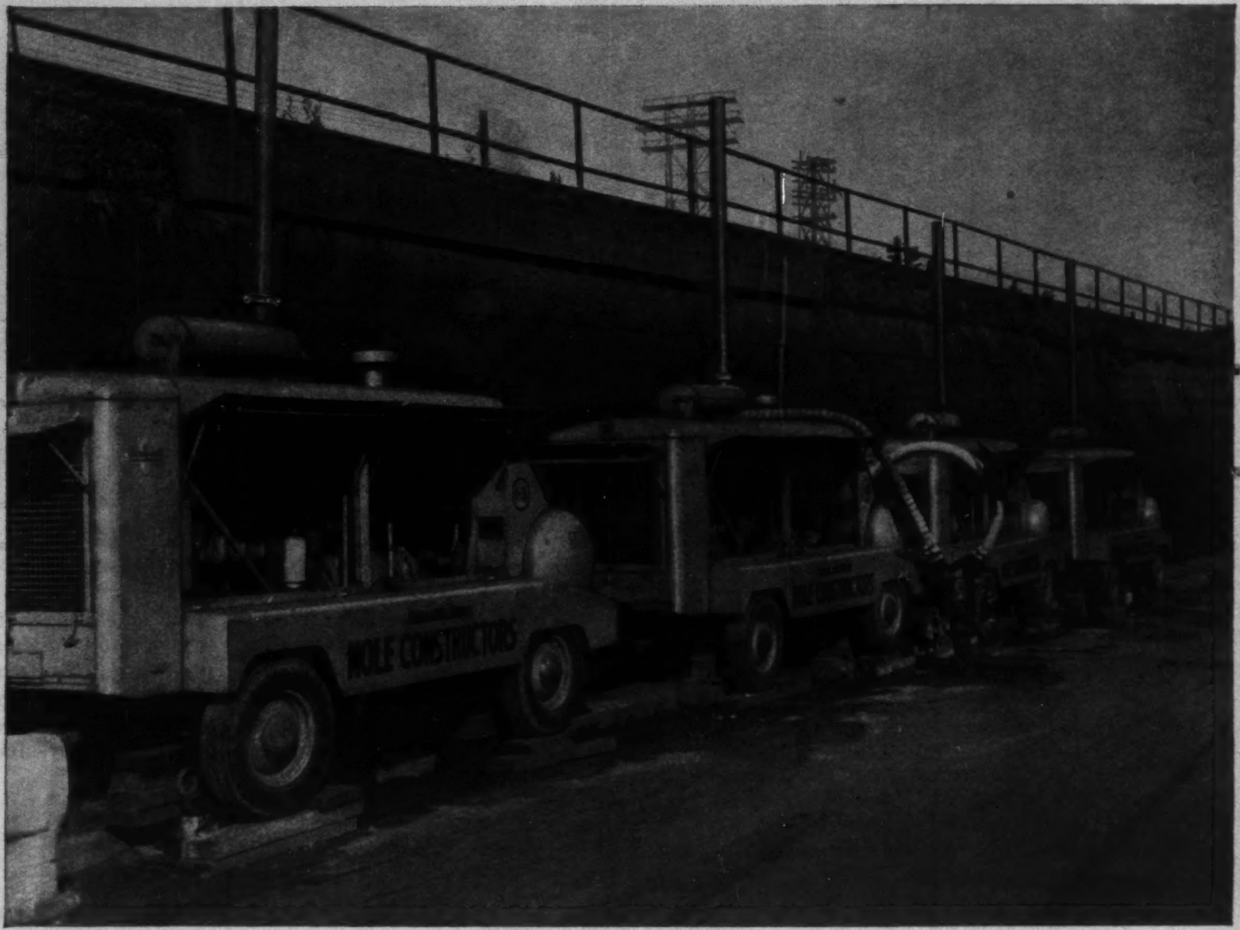

Versatility of the Gyro-Flo is illustrated above as four 600-cfm units are banked in parallel to provide reserve capacity low pressure air at 50 psi, throttled to 15 psi in the heading. Simple exhaust stack extensions were added to keep carbon monoxide out of the heading.

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"When Mole Constructors began the Allegheny Sanitary Project in March, 1956, we knew that reliability of equipment could mean the difference between operating in the black or in the red. On our seven tunnel contracts beneath the rivers of Pittsburgh, Ingersoll-Rand rotaries were the natural choice for portable air compressors. Eleven DR600s and one DR315 were purchased to supply high-pressure air for tools, and low-pressure air for ventilating the headings.

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This testimonial was given by Mr. Scaravilli, a man who knows contracting equipment from years of personal experience. He is a representative of Square Construction Co., a unit of the Mole Constructors tunnel contractor combine, Rankin, Pa.

As evidence of stamina and service-proved dependability, this record speaks for itself. A quarter of a million hours in almost continuous operation without a single forced shutdown is an almost unbelievable record. *Each* compressor has logged over 22,000 hours—equivalent to driving the family car 900,000 miles at an average speed of 40 miles an hour! It is significant, too, that this record applies not to a single compressor, but to *all twelve* Gyro-Flo units used on this big tunneling job.

All Ingersoll-Rand Gyro-Flo compressors are designed and built for heavy-duty service. And, the Allegheny Sanitary Project is another example of how they have continuously demonstrated their dependability on all types of projects, throughout the world, since their introduction in 1950.

When interruptions to your air supply mean costly delays on any contracting job, Gyro-Flo compressors are a sound investment. They are available in a *complete line* to meet every job requirement, in sizes from 85 to 900 cfm. Ask your I-R representative for information on the sizes best suited to your needs.

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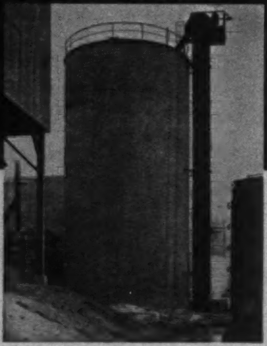

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(Continued from page 292)

Tex., Marble Falls—Marble Falls W.C. & I.D. No. 1, sewer facilities (PFL-TEX.-153) **$350,000.** Frank T. Drought, San Pedro at Woodlawn, San Antonio, consult. engr. CD 2/13/59.

Tex., Waco—McLennan County Water Dist. 3, Old Corsicana Rd., Bellmead, voted bonds Feb. 27 sanitary-storm sewerage sys. extensions, imprvs. at Bellmead. **$300,000.** CD 2/18.

Utah, Salt Lake City—Salt Lake City Corp., City-County Bldg., sanitary sewer relief line, 3rd E from S. Temple to 5th S. and along 5th S. from 3rd E to State St. **$133,244.** CD 8/30/54.

▲ **Va., Martinsville**—City, City Hall, voted bonds March 1, sewerage imprvs., **$3,500,000,** Wiley & Wilson, Courtland Bldg., Lynchburg, consult. engrs.; sewage disposal systems, **$834,634.** CD 1/5.

▲ **Ont., Hamilton**—City, City Hall, trunk sewers, Red Hill Creek, **$3,100,000.** CD 2/6/56.

Ont., Westminster Twp.—Twp. Council, R.R. 10, London, sewer extensions, Wellington Rd. area. **$100,000.** S. G. Chipman, 234 Queens Ave., London, owners engr.

Ont., Whitby—Consolidated Building Corp. Ltd., 99 Avenue Rd., Toronto, 10 m.g.d. sewage disposal plant for residential development, Western Heights, Pickering Twp., east of here, **$570,000.** Marshall, Macklin & Monaghan, 1480 Don Mills Rd., Toronto, consult. engrs.

BRIDGES

Ill., Murphysboro—City, City Hall, bond election Apr. 12, bridge imprvs. **$980,000.** John T. Blankenship, Murphysboro, consult.-engr.

N. J., Bridgeton — Bd. Freeholders Cumberland Co., Bridgeton, Vine St. bridge, Millville. **$300,000.**

OHIO—Dpt. Hys., State Depts. Bldg., Columbus,
Lucas Co.—bridge on Broadway over N.Y.C.R.R. tracks. **$375,000.**

PENNSYLVANIA—State Hy. Dpt., 506 North Office Bldg., Harrisburg,
Beaver Co.—rebuilding Mahoning Ave. Viaduct, New Castle. **$600,000.**

VIRGINIA—Dpt. Hys., 1221 E. Broad St., Richmond,
Page Co.—bridge, approaches, Jeremiah's Run, Proj. FAS 0611-069-101B1,**$90,000.**
bridge, approaches, Jeremiah's Run, Proj. FAS 0611-069-1-2 B2, **$90,000.**

▲ **Ont., London**—City, City Hall, overpass above Canadian National R.R. tracks, Adelaide St. **$1,000,000.** M. M. Dillon Assocs., 141 Maple St., consult. engrs. K. R. Rowntree, City Hall, owners engr. CD 3/4.

STREETS AND ROADS

Calif., Los Angeles—City, City Hall, imprv. streets in Hubbard St. and Gladstone Ave. Imprvt. Dist. **$100,698.**

CONNECTICUT—State Hy. Dpt., 24 Wolcott Hill Rd., Wethersfield,
Fairfield—reconstruct N. Benson Rd. Rte. 135, between Connecticut Tpk. and Stillson Rd. 1.9 mi. **$450,000.**

Ill., Joliet—City, City Hall, reconstr., wid'n. Jefferson St. **$110,000.** CD 3/17/59.

OHIO—State Hy. Dpt., State Depts. Bldg., Columbus, Zone 15,
Butler Co.—wid'n. Main St. in Hamilton to 48 ft. from Haldimand Ave. to Old Oxford Rd. **$450,000.**

▲ **O., Cincinnati**—City, City Hall, imprvt. Erie Ave. Whetsel to Plainville, Duck Creek to Ridge to Madison Rd., connection at Ridge to Grandin to Torrence to Corpline. **$1,575,000.** Art Bird, owners engr. CD 11/9/56.

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg,
Allegheny Co.—signs 15 mi. Penn-Lincoln Parkway between Churchill and Rosslyn Farms, **$900,000.** Richardson, Gordon & Assocs., 3 Gateway Center, Pittsburgh, consult. engrs.
Washington Co.—17 mi. Rte. 40 between Washington, Pa., and W. Va. state line (Interstate), **$23,000,000.** F. S. Poorman, c/o owner, engr. CD 2/17.

PENNSYLVANIA — State Hy. Dpt., 506 North Office Bldg., Harrisburg,
Lycoming Co.—High St. Bridge Rte. 15, Williamsport. **$700,000.**

Tex., Anson—Jones County, Courthouse, county road repairing, imprvs., for 1960. **$122,222.**

Tex., Archer City—Archer County, c/o Courthouse, general road repairing, reworking, drainage. **$119,626.**

Tex., Giddings—Lee County, c/o Comrs. Ct., Courthouse, county-wide road imprvs. **$106,586.**

Tex., Jacksboro—Jack County, c/o Courthouse, road and bridge repairing, maintenance, for 1960. **$109,160.**

Tex., Livingston—Polk County, Comrs. Ct., Courthouse, county-wide road imprvs. **$127,218.**

Tex., Snyder—Scurry County Comrs. Ct., Courthouse, general county-wide road and bridge repairing and imprv., drainage. **$164,246.**

VIRGINIA—Dpt. Highway, 1221 E. Broad, Richmond,
Craig Co.—grading, drainage, paving from Botetourt Co. Line west, incl. bridge over Wright Branch and Craig Creek, Proj. FAS (FH) 0606-022-008, **$100 000.**
Halifax Co.—grading, drainage, paving from Rte. 360 to city limits Clover and from city limits Clover to Rte. 603, Projs. FAS 0746-041-030 C1 and FAS 0746-041-031, **$100,000.**

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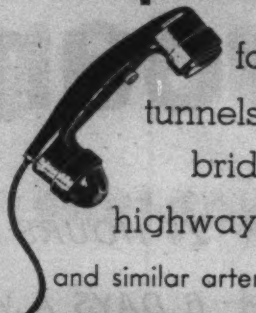

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Hanover Co.—grading, drainage, paving from Rte. 691 to S. of Rte. 33, Proj. FAS 0611-042-102, C1, $90,000.

Prince George Co.—grading, drainage, paving 3.38 mi. between Hopewell and Petersburg, Rte. 36, Proj. F 0036-074-101, $90,000.

grading, drainage, paving from Rte. 626 to city line, Petersburg, Proj. FI-0095-074-013 P-1, $100,000.

Washington Co.—grading, paving, drainage Tennessee State Line to Bristol Spur, Proj. FI 0081-085-013 P-1, $100,000.

Ont., Stratford—Perth County Council, City Hall, roads, $420,000. J. A. Coombs, County Bldg., owners engr.

EARTHWORK, WATERWAYS

Conn., New Britain—City, City Hall, flood control Dry and Belden Sts. Areas. $275,000. Anderson-Nichols, Inc., 11 Asylum St., Hartford, consult. engr. CD 11/4.

Ont., Port Burwell—Dpt. P. Wks., Hunter Bldg., Ottawa, dredging, $163,000.

AIRPORTS

Alaska, Kotzebue—AIRPORT IMPRVS.—State Div. Aviation, Juneau, float dock, reconstr. lighting sys., erosion control, Ralph Wien Memorial Airport. $180,000.

Ark., Little Rock—PARKING RAMP—City, City Hall, aircraft parking ramp, Stage 2, Adams Field, $150,000. CD 11/11/54.

Calif., Bakersfield — TAXIWAYS, etc. — Kern County, County Bldg., 2 taxiways, widening taxiways, secondary runways, holding apron, Meadows Field, $800,000.

Calif., Concord — AIRPORT IMPRVS. — Contra Costa County, enlarging terminal, apron, fencing, Buchanan Field. $100,000.

Calif., Hayward—AIRPORT IMPRVS.—City, City Hall, taxiway, transient apron, drainage, Hayward Municipal Airport. $200,000.

Calif., Long Beach—AIRPORT IMPRVS.—City, City Hall, terminal apron extension, taxiways, lighting, Long Beach Municipal Airport. $400,000.

Calif., Modesto—CONTROL TOWER—City and Stanislaus County, City Hall, control tower at Modesto City-County Airport, $100,000.

Calif., Redwood City—AIRPORT IMPRVS.—San Mateo Co., County Bldg., reconstr. runway, terminal apron, lighting and beacon, San Mateo County Airport, Palo Alto. $100,000. CD 11/10/54.

Calif., Riverside—AIRPORT IMPRVS.—City, City Hall, taxiway extension, wid'n. taxiway, holding apron, lighting, Riverside Municipal Airport. $100,000. CD 12/11/44.

Calif., San Diego — AIRPORT IMPRVS. — San Diego County, County Bldg., taxiway, holding, apron, lights, Gillespie Field, $100,000.

Calif., Stockton — AIRPORT IMPRVS. — San Joaquin County, constr. and light by-pass taxiway, terminal apron, fencing and floodlights, Stockton Airfield, $200,000.

Calif., Torrance—AIRPORT IMPRVS.—City, City Hall, control tower, Torrance Municipal Airport, $140,000.

Colo., Pueblo—CONTROL TOWER, etc.—City, City Hall, combined station and control tower, Pueblo Memorial Airport, $198,000.

▲ **Fla., Tampa**—RUNWAYS—Hillsborogh Co. Aviation Auth., Tampa International Airport, paving North-South Runways, taxiway, lighting, Tampa International Airport, $1,300,000. CD 11/27.

Ga., Atlanta—TAXIWAY—City, City Hall, East Taxiway and cargo taxiway, 4 high speed turnoffs, enlarge northeast apron, Atlanta Municipal Airport, $780,000.

Ga., Augusta—RUNWAY—City, City Hall, jet runway, Bush Field, $100,000. Kuhlke & Wade, Broad and 10 Sts., consult. engrs.

Ga., Dalton—RUNWAY, etc.—City, City Hall, Northwest and Southeast runway, apron and taxiway, Dalton Municipal Airport $120,000.

Ga., Rome—RUNWAY—Floyd Co. County Bldg., extending North-South Runway, taxiway, relocate Hatfield Rd., Russell Field, $190,000.

Ga., Toccoa—RUNWAY, etc.—City, City Hall, runway, parallel taxiway, apron lighting, beacon, Toccoa (Le Trouneau) Airport $160,000.

Hawaii, Hilo—AIRPORT IMPRVS.—State of Hawaii, Office P. Wks., Corner Punchbowl and Queen St., clearing, grubbing, grading, lighting General Lyman Field. $250,000.

▲ **Hawaii, Honolulu** — AIRPORT IMPRVS. — State of Hawaii, Office P. Wks., Corner Punchbowl and Queen St., Stage 8 and development, clear, grade and drain new terminal area, paving overseas parking apron, apron taxiway, reconstr. taxiway paving and holding apron, Honolulu International Airport, $1,900,000.

Idaho, Idaho Falls — AIRPORT IMPRVS. — City, City Hall, taxiway, widening taxiway, drainage, Fanning Field, $200,000.

Ill., Decatur—CONTROL TOWER, etc.—Park Dist. of Decatur, City Hall, control tower and utilities, Decatur Municipal Airport, $200,000.

▲ **Ind., Indianapolis**—AIRPORT IMPRVS.—City, City Hall, runway, aircraft parking apron, paving islands in terminal area, strengthening runway, lighting and connecting taxiways, Indianapolis Municipal (Weir Cook) Airport, $1,600,000. CD 6/7/56.

Ind., Kokomo—AIRCRAFT APRON—City, City Hall, aircraft apron at Kokomo Municipal Airport, $100,000.

Ind., Terre Haute—AIRPORT IMPRVS.—City, City Hall, taxiway, apron extension, wid'n. center taxiway, Hulman Field, $140,000.

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Iowa, Davenport—SHOP AND STORAGE HANGAR, etc.—Davenport Airport Comn., City Hall, shop and storage hangar and 30 addnl. T-hangars, Davenport Municipal Airport. $550,000. CD 11/24.

Iowa, Mason City—ATCS QUARTERS, etc.—City, City Hall, ATCS quarters, engine generator room, Mason City Municipal Airport, $150,000.

Iowa, Sioux City—AIRPORT IMPRVS.—City, City Hall, rehabilitate apron, fencing, Sioux City Municipal Airport, $100,000.

Ky., Lexington—AIRPORT IMPRVS.—City of Lexington and Fayette County, taxiway extension, widening taxiway, lighting, Blue Grass Field. $400,000.

La., New Orleans — AIRPORT IMPRVS. — Bd. Levee Comrs., Orleans Levee Dist., reconstruct runway, relocate runway lighting, installing lighting, runway and taxiway extension, New Orleans Airport. $600,000.

Me., Fryeburg—AIRPORT IMPRVS.—Town, Town Hall, approach clearing, runway, stub taxiway, apron, access road, lighting, Eastern Slopes Airport. $100,000.

Md., Baltimore—AIRPORT IMPRVS.—City Council, City Hall, runway extension, taxiway and holding apron, Friendship International Airport. $700,000. CD 9/18/46.

Mass., East Boston—PARKING FACILITIES—Commonwealth of Mass., Port Authority, 14 Court Sq., Boston, auto parking facilities, Logan International Airport, $100,000. Constr. 1960. CD 5/20/59.

Mass., Lawrence—AIRPORT IMPRVS.—Airport Comn., City of Lawrence, City Hall, widening existing taxiway, extensions and holding pads to taxiways, lighting, Lawrence Municipal Airport. $500,000.

Mass., Springfield—AIRPORT IMPRVS.—City, City Hall, runway, taxiway, Springfield Municipal Airport. $295,000.

▲ **Mass., Worcester**—AIRPORT IMPRVS.—City Airport Comn., City Hall, site preparation for runway extension, taxiway, Worcester Municipal Airport. $2,000,000.

Mich., Detroit — AIRPORT IMPRVS. — City, City Hall, control tower, utilities, Municipal Airport. $400,000.

Mont., Great Falls — AIRPORT IMPRVTS. — City, City Hall, runway, bit. surf. overlay on runway and apron, enlarging apron, Great Falls International Airport. $900,000.

N. M., Farmington — AIRPORT IMPRVS. — City, City Hall, bond election Apr. 5, airport imprvs. $120,000.

PUBLIC BUILDINGS

▲ **Calif., Bakersfield**—SCHOOLS—Kern Co. Union High School & Junior College Dist., 1341 "F" St., plans by Eddy & Paynter, 2901 "H" St., Bakersfield, high school, East Bakersfield, $2,700,000, plans by Wright, Metcalf & Parsons, 2323 "E" St., Bakersfield, Calif.; science classroom bldg., Bakersfield College, $600,000, plans by Thomas & Leydenfrost, 602 Haberfeld Bldg., Bakersfield, Calif.; gym, girls' shower locker room, multi-purpose bldg., Burroughs High School, $540,000. CD 2/18.

▲ **Calif., Los Alamitos**—SCHOOL—Alamitos School Dist., voted $3,000,000 bonds Mar. 1, (will accept $14,500,000 from State), school const.

▲ **Calif., Riverside**—HEALTH—Riverside County, Courthouse, plans by H. O. Ruhnau, Mission Inn Rotunda, Riverside, 5 story, rein.-con. health bldg., 11th and Orange Sts. $1,500,000.

▲ **Calif., San Rafael**—SCHOOL—San Rafael High School, 215 Mission St., voted $2,800,000 bonds Mar. 1, high school. Gromme, Mulvin & Priestley, 1539-A 4th St., archts. CD 11/9/56.

Colo., Boulder—COURTHOUSE—Bd. Comrs. Boulder Co., Courthouse, courthouse addns, alterations, $500,000.

Colo., Fort Logan—HOSPITAL—State Planning Div., State Capitol, Denver, plans by Ralph D. Peterson, 1750 Humbolt St., Denver, barracks renovation, for hospital. $600,000. CD 1/26/59.

▲ **Conn., Bridgeport**—HOUSING—Bridgeport Housing auth., 252 Hallett St., plans by Tob Vece, 9 Roger Williams Rd., 216 unit housing for elderly and low income group, $2,500,000.

Conn., Danbury—HOUSING—Danbury Housing Auth., Lake Ave. Extension, plans by Frank A. LaCava, 248 Main St., Housing for Elderly, Rogers Park, $420,000. CD 2/19.

▲ **Conn., Jewett City**—SCHOOL—Town of Griswold Bd. Educ., Slater Ave., elementary school $550,000; plans by Malmfeldt Assocs., 36 Pearl St., elementary school, Preston Rd., $700,000.

▲ **Conn., Watertown**—SCHOOLS—Town, Town Hall, Junior High School, $2,000,000; Elementary School, $759,000; Elementary School, $550,000; Elementary School, $660,000; Swift Junior High School addn., $425,000; Elementary School, $902,000.

▲† **D. C., Wash.**—COURT OF CLAIMS—General Services Admin., 19 and F Sts. N.W., U.S. Court of Claims, Madison Square, opposite Lafayette Square, $6,350,000 (no appropriation).

Fla., DeFuniak Springs—HOUSING—DeFuniak Springs Housing Auth. plans by Thompson & Hancock, 3166 Maple Dr., Atlanta, Ga., 50 unit housing. $400,000.

Fla., Miami — HOUSING — Miami Housing Auth., 327 N.W. 62 St., 66 unit housing, N.W. section. $575,000. Rader & Assocs., 100 Biscayne Blvd., South Miami, consult. engrs.

▲ **Fla., Titusville** — HOUSING — Brevard Co. Housing Auth., 100 units housing, Cocoa, $1,200,000; 56 unit housing, Titusville, $800,000. Rader & Assocs., 405 Florida Ave., Cocoa, consult. engrs.

Ga., Brunswick—COURTHOUSE—Comrs. Glynn Co. Courthouse, plans by Abreu & Robeson, 1522 Richmond St., courthouse remodeling, addns. $625,000.

Ill., Chester—COURTHOUSE—Bd. Comrs. Randolph Co., County Bldg., courthouse, $850,000. Bids about May CD 3/24/54.

Ill., Wauconda—HIGH SCHOOL—Wauconda Twp. High School Dist. 118, voted bonds Mar. 5, high school, Rand Rd. north of Hubbard Woods, $975,000. CD 5/13/57.

Iowa, Boone—SCHOOL—Bd. Educ., Community School Dist., voted $550,000 bonds Jan. 11, school, Karl Keffer Assocs., 202 Masonic Temple Bldg., Des Moines, archt. CD 2/1.

Kan., Kansas City—SCHOOL—Corinth School Dist. No. 32, 83rd and Mission Rd., Kansas City 15, Mo., voted $520,000 bonds Feb. 27, elementary school, 86th and Nall Ave., Leawood.

▲ **Kentucky** — ELECTRIC GENERATING PLANT — Kentucky Power Co., 15 St. and Carter Ave., Ashland, 265,000 kw. generating plant, Big Sandy River near Louisa, Lawrence Co. $39,000,000. American Electric Power Service Corp., 30 Church St., New York 8, N. Y., engrs. To go ahead 1960.

La., New Iberia—PLANT—City, City Hall, plant to manufacture flower pots from Bagassee, $300,000. Pullen Moulded Products, Inc., lessee.

Me., Madawaska—HIGH SCHOOL—Town, St. Thomas St., plans by Bunker & Savage, 86 Court St., Augusta, Me., high school. Approx. $400,000.

† **Mass., Boston**—MAIL HANDLING PLANT—General Services Admin., P.O. Dpt. 12th and Pennsylvania Ave. N.W., Wash., 25, D. C., plans by Pedersen & Tilney, archts. and engrs., 1430 Mass. Ave., mechanical mail handling plant at Capital South Postal Annex. Over $400,000. CD 1/14.

Mass., Boston — APARTMENT — Owner, c/o Conant Assocs., archts.-engrs., 210 Broadway, Everett, apartment. Approx. $800,000. Constr. 1960.

Mass., Easthampton—SCHOOL—Town, Supt. Schools, plans by Munson & Mallis, Inc., 6 Frost St., Springfield, Mass., elementary school. Approx. $500,000. Constr. 1960. CD 12/24.

▲ **Mass., Taunton**—INFIRMARY—Commonwealth of Mass., Div. Bldg. Constr., 38 Chauncy St., Boston, plans by Kendall, Taylor & Co., Inc., 12 Norfolk St., Cambridge, Proj. M-59-15 Male infirmary addn., State Hospital. $2,000,000-$2,500,000. Constr. 1960.

▲ **Minn., Canby**—SCHOOL—Bd. Educ. Independent School Dist. No. 891, voted $1,655,000 bonds Feb. 23, elementary school. Matson & Wegleitner, 2323 Wayzata Blvd., Minneapolis, archts. CD 2/4.

Minn., Pipestone — SCHOOL — Bd. Educ. Independent School Dist. No. 583, voted $760,000 bonds Feb. 16, school. Matson & Wegleitner, Associated Architects, 2323 Wayzata Blvd., Minneapolis, Minn., archts. CD 2/9.

▲† **Miss., Clarksdale** — POST OFFICE, etc. — General Services Admin., 19th and F Sts. N.W., Wash., D. C., post office and federal office. $1,812,000 (no appropriation).

▲ **Mo., Mehlville (St. Louis 25 P.O.)**—SCHOOLS—School dist. R-9, Bd. Educ., 3200 Lemay Ferry Rd., Zone 25, voted $1,225,000 bonds Mar. 1, schools. CD 2/26.

Mont., Libby—SCHOOL—Libby High School Dist., high school, $724,375.

▲† **Neb., Mercury** — TEST CELL C — Atomic Energy Comn., P.O. Box 540, Albuquerque, N. M., plans by Air Products Inc., Trexlertown, Pa., Test Cell C, Project Rover, (Nuclear Rocket Propulsion Reactor) at Nevada Test Site. $8,000,000. Burns & McDonnell Engineering Co., 95th and Troost Sts., Kansas City, Mo., engr. CD 9/12.

▲ **N. J., Bayville**—SCHOOL—Ocean Co. Central Regional High School Dist., defeated referendum on bonds and project Mar. 1, high school addn., Berkeley Twp., $1,860,000. Ernest Brown, Watchung Ave., Plainfield, archt. CD 12/14.

▲ **N. J. Carteret**—SCHOOLS—Bd. Educ., Borough of Carteret, bond election May 3, West Carteret School, $450,000, CD 5/28; Columbus School, $725,000, CD 1/22. Murray Liebowitz, 214 Smith St., Perth Amboy, archt.

N. J., Mays Landing—COUNTY JAIL—Bd. Freeholders Atlantic County Guarantee Trust Bldg., Atlantic City, plans by Donald A. Rosenstein, Guarantee Trust Bldg., Atlantic City, County Jail wing addn., alterations, $800,000.

N. J., Paterson—PARKING GARAGE—Paterson Parking Auth., City Hall, 3 story parking garage, Ward St. $410,000. Constr. this Spring. Tippetts-Abbett-McCarthy-Stratton, 375 Park Ave., New York, N. Y., consult. engrs.

▲ **N. J., Ramsey**—SCHOOL—Bd. Educ., bonds and project to be submitted to referendum May 10, North Central Ave. School, $1,900,000. Eppel & Seaman, 901 Broad St., Newark, archts. Referendum scheduled for March 29 cancelled. CD 2/15.

N. J., Toms River—COURT HOUSE, etc.—Bd. Freeholders Ocean Co., Court House, plans by Kelly & Gruzen, 60 Park Place, Newark, court house and jail addns., modernization, $500,000. CD 1/21.

▲ **N. M., Gallup**—HIGH SCHOOL—Ind. School Dist., plans by Wolgamood-Millington & Assocs., Suite 4, Lansic Bldg., Santa Fe, Gallup-McKinley High School, N.Mex-61-C-402-A11. $1,045,800.

▲ **N. Y., Buffalo**—PARKING RAMP—City, City Hall, plans by Backus, Crane & Love, 232 Delaware Ave., Zone 2, 4 level parking ramp., $1,500,000. Wilbur Smith, 495 Orange St., New Haven 11, Conn., consult. engr.

N. Y., Buffalo—PLANT—Niagara Frontier Port Auth., City Hall, Zone 2, will not construct plant on Buffalo Port Terminal. $200,000. Cummins-Diesel Power, Inc., lessee. Prospective lessee has taken over present local facility and will use this as operations headquarters. Project has been abandoned. CD 12/28.

▲ **N. Y., Island Park**—SCHOOL—Bd. Educ., Radcliffe Rd., Island Park, voted $2,697,000 bonds Jan. 21, school. Reginald Marsh & Assoc., 101 Park Ave., New York, N. Y., archts. CD 1/7.

N. Y., Hicksville—SCHOOL—Bd. Educ. plans by Knappe & Johnson, 2110 Northern Blvd., Manhasset, Senior High School addn. $635,000.

▲ **N. Y., New York**—SERVICE—Dpt. Parks, Arsenal Bldg., Zone 21, plans by Brown, Lawford & Forbes, 224 E. 46th St., Zone 17, service bldg. for Metropolitan Museum of Arts, Central Park. $1,268,000. CD 3/22/43.

▲ **O., Cleveland**—SCHOOLS—Bd. Educ., 1380 E. 6th St., Zone 14, plans by Earl Shobe, c/o owner,

Churchill-Orville Ave. Junior High School, $3,000,000; Constr. in 1960.

Glenville area Elementary School No. 1, $1,250,000.

Myron T. Herrick Junior High School Auditorium, $500,000.

Hough area Elementary School No. 1, $1,250,000.

Hough area Elementary School No. 2, $1,250,000.

Hough area Elementary School No. 3, $1,250,000.

Kennard Junior High School gimnasium, $500,000.

Occupational School for girls, $1,150,000.

Rocky River Dr. Elementary School, $640,000.

South High School Gymnasium, $500,000.

Warren Elementary School, $750,000.

Junior High School, vicinity of James Ford Rhodes High School, $2,000,000.

O. Cortland—HIGH SCHOOL—Bazetta Bd. Educ., voted bonds Mar. 1, high school, $643,000. CD 1/20.

▲ **O., Dayton**—HOUSING—Dayton Metropolitan Housing Auth., Harries Bldg., plans by Paul Brown & John Head, 297 W. 1st St., and Craighead Cowden, 384 W. 1st St., 212 Housing units for the elderly. Over $1,000,000.

▲ **O., Streetsboro**—SCHOOLS—Bd. Educ. plans by Hunter & Howard, 705 Mahoning St. N.W., Warren, schools, $1,050,000. CD 1/13.

▲ **Ore., Eugene**—SCHOOLS—Lane Co. (Eugene) School Dist. No. 4, 275 7th Ave., voted bonds Mar. 1, schools, $3,000,000. CD 1/29.

▲ **Pa., California** — DORMITORY, etc. — General State Auth., 18th and Herr Sts., Harrisburg, women's dormitory, $1,000,000; boiler plant addn., California State College, $200,000. A. F. Jones, ch. engr., c/o owner.

Pa., Plymouth Meeting — HIGH SCHOOL — Plymouth-Whitemarsh Joint School Dist., high school addn., $400,000. CD 2/25/57.

▲ **Pa., Wilkes-Barre**—PARKING GARAGE—Wilkes-Barre Parking Auth., City Hall, parking garage, $1,150,000.

Pa., Willow Grove—SCHOOL—Upper Moreland Twp. School Auth. plans by Haag & D'Entremont, 400 Cedar St., Jenkintown, elementary school. Over $400,000. CD 1/14.

▲ **Tex., Dallas**—HIGH SCHOOL—Dallas Ind. School Dist., 3700 Ross Ave., plans by Goodwin & Cavitt, Vaughn Bldg., Junior High School, Forest St. and Cox Lane, $1,500,000. CD 12/15/54.

Tex., Greenville—SCHOOLS—Greenville Ind. School Dist. plans by Roy Kilmer, Greenville, Junior Senior High-Elementary School addns. unit, $450,000. elementary school, $400,000. CD 2/16.

Tex., San Antonio—SCHOOL—Alamo Heights Ind. School Dist., 150 E. Fair Oaks St., plans by Bartlett Cocke, 3501 Broadway Ave., school. $400,000. CD 3/7.

▲ **Tex., Wharton**—HIGH SCHOOL—Wharton Ind. School Dist. plans by Matt E. Howard, Jr. & Associates, archts. and consult. engrs., 1719 Sunset Blvd., Houston, high school, $1,250,000. CD 2/9.

▲ **Va., Roanoke**—SCHOOLS—City School Bd., plans by Smithey & Boynton, 319 McClanahan, Roanoke, Shrine Hill High School, $1,000,000; plans by Hayes, Seay, Mattern & Mattern, 1615 Franklin Rd. S.W., Roanoke, William Fleming High School, $1,000,000; plans by Thompson & Payne, 609 Jefferson St., Roanoke, Round Hill School, $500,000. CD 3/23/45.

Wash., Seattle—DORMITORY—State Dpt. Gen. Admin., Olympia, plans by B. F. McAddo, Jr., 1817 Olive Way, dormitory at Labor & Industries Rehabilitation Center. $425,000. Bids in August.

Wis., Chippewa Falls—LAUNDRY and COMMISSARY—Dpt. P. Welfare, Madison, plans by Paul, Hallbeck & Anderson, 102 E. Grand Ave., Eau Claire, laundry and commissary bldg. $500,000. R. D. Culvertson, state engr. CD 7/19/54.

▲ **Wis., Madison**—STATE OFFICE—State of Wisconsin plans by Grassold-Johnson Assoc., 734 N. Jefferson, Milwaukee, 485,000 sq. ft. office for Dpt. Agriculture, Conservation, Motor Vehicle and part of Industrial Comn. $13,350,000. Ralph Culbertson, c/o owner, state engr. CD 9/10/58.

▲ **Alta., Edmonton**—POST OFFICE—Dpt. P. Wks., Hunter Bldg., Ottawa, Ont., plans by Aberdeen & Groves, 8411½ 109th St., post office, $3,500,000. CD 1/12/59.

▲ **N. S., Truro**—COLLEGE—Dpt. P. Wks., Parliament Bldgs., Halifax, Teachers College, $1,225,00; auditorium and gymnasium, $480,000; women's residence, $630,000.

Ont., Cooksville—HOSPITAL—South Peel Hospital, 100 Upper Middle Rd., plans by Chester C. Woods, 2842

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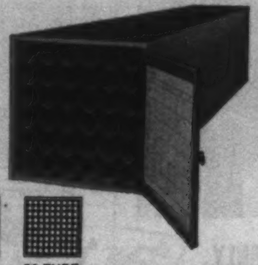

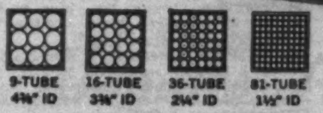

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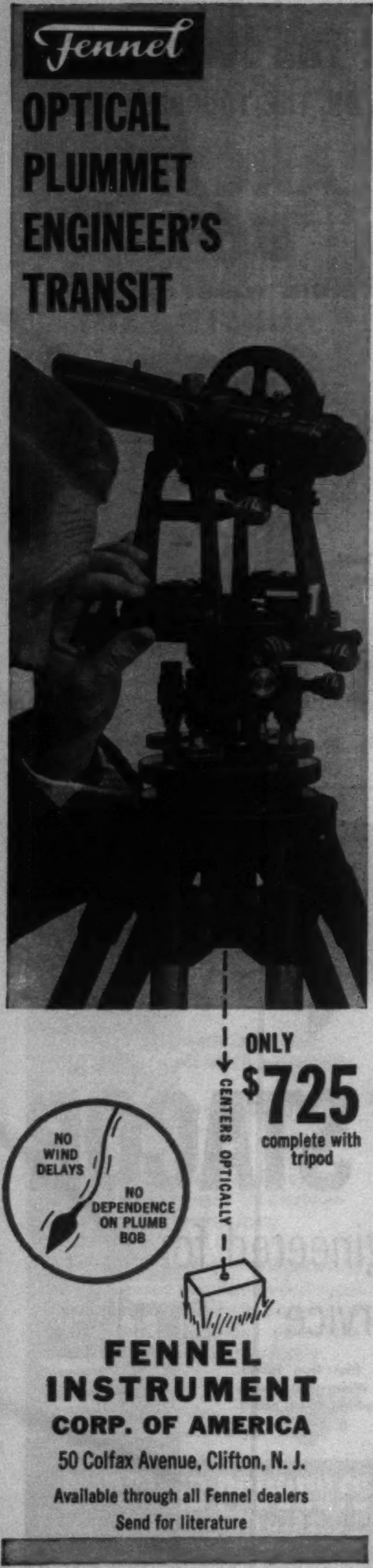
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▲ **Ont., Kitchener**—POST OFFICE—Dpt. P. Wks., Hunter Bldg., Ottawa, post office, **$4,000,000-$5,000,000.**

▲ **Ont., London**—POSTAL TERMINAL—Dpt. P. Wks., Hunter Bldg., Ottawa, plans by Blackwell & Hagarty, 310 Princess Ave., postal terminal, Clarence and York Sts. **$1,000,000.**

Ont., London—MEDICAL SCHOOL—University of Western Ontario, Rm. 204, Stevenson Hall, medical school, on campus, Over **$500,000.**

▲ **Ont., Ottawa** — ADMINISTRATION — Dpt. P. Wks., Hunter Bldg., plans by Balharrie, Helmer & Morin, 77 Metcalfe St., administration bldg. for Health & Welfare Dpt., Tunney's Pasture, **$1,200,000.** CD 9/20/57.

▲ **Ont., Ottawa** — ADMINISTRATION — Dpt. P. Wks., Hunter Bldg., plans by Hart Vincent Massey, 77 Metcalfe St., administration bldg. for Dpt. Agriculture, **$1,000,000.** CD 11/1/55.

Ont., Ottawa—UNEMPLOYMENT INSURANCE COMMISSION—Dpt. P. Wks., Hunter Bldg., Unemployment Insurance Comn. Bldg. **$400,000.**

Ont., Ottawa—Dpt. P. Wks., Hunter Bldg., Royal Canadian Mounted Police Bldgs., Hurdman's Bridge, **$400,000.** CD 2/9/53.

Ont., Toronto—POSTAL TERMINAL, etc.—Dpt. P. Wks., Hunter Bldg., plans by Allward & Gouinlock, 245 Davenport Rd., and Gordon S. Adamson & Assocs., 52 St. Clair Ave. E., postal terminal and delivery bldg., Fleet and York Sts. Over **$500,000.**

▲ **Ont., Toronto** — RESEARCH LABORATORY — Hydro-Electric Power Comn. of Ontario, 620 University Ave., rein.-con. concrete block research laboratory, Kipling Ave. **$2,750,000.**

▲ **Que., Montreal**—CITY HALL ANNEX—City, City Hall, 16 to 18 story city hall annex, Berri, Notre Dame, Gosford and Craig Sts. **$3,000,000.**

COMMERCIAL BUILDINGS

▲ **Alaska, Juneau**—HOUSES—L. H. Schulte, c/o Stone & Schule, Inc., Realtors, 1745 W. San Carlos, San Jose, Calif., 200 houses. **$4,000,000.**

Calif., Anaheim—DWELLINGS—Pom Investment, 2180 Harbor Blvd., 14 stucco multiple dwellings, 903 S. Citron St. **$420,000.**

Calif., Arlington—DWELLINGS—Amberwood Bldg. Co., c/o Western Drafting, archt., 494 Newport Blvd., Newport Beach, 52 dwellings, Amberwood Tract. **$550,000.**

Calif., Los Angeles—BANK AND OFFICE IMPRVS.—Union Bank, 325 W. 8th St., plans by S. E. Lundeen & Assoc., 548 S. Spring St., bank and office alterations and air conditioning. **$700,000.** R. E. Phillips, 2001 W. Olympic Blvd., consult. engr.

▲ **Calif., Los Altos**—RESIDENTIAL DEVELOPMENT—Platypus Properties, Inc., 275 Bush St., San Francisco, Calif., residential development near Arastradero Rd. on Page Mill Rd. at Schroll Rd. **$3,000,000.** Lawrence G. Brian, 1526 Main St., Redwood City, consult. engr. Constr. in Summer 1960.

▲ **Calif., Sacramento** — OFFICE — Don L. Lucas and Charles F. Savage, c/o Lucas & Co., 827 J St., 15 story, 40,000 sq. ft. office, 21st and T Sts. **$7,000,000.**

Colo., Glendale—THEATER—Cooper Foundation Theaters, 325 Stuart Bldg., Lincoln, Neb., plans by Richard Crowther, 257 Fillmore, Denver, cinerama theater to seat 950. **$750,000.** CD 2/29.

▲ **Conn., Fairfield**—MOTEL—Barry Bruce Corp., c/o Anderson & Petrofsky, archts., 177 State St., Bridgeport, 47 unit brick veneer, block masonry motel and swimming pool, Black Rock Tpk. **$1,000,000.** CD 1/27 under Harold J. Skidd, as owner.

Conn., Farmington—HOUSING—Seymour S. Said, 21 Proctor Dr., West Hartford, plans by Roland Aubin, Pleasant Valley Rd., South Windsor, 57 houses, Finnemann Rd. **$570,000.** CD 1/6.

Conn., Wallingford — CLUBHOUSE — The Farms, 135 Colony St., Meriden, plans by Derek Kipp, Montclair, N. J., clubhouse, 18 hole golf course and swimming pool, "The Farm," Cheshire Rd. **$400,000.** Geoffrey S. Cornish, Amherst, Mass., assoc. archt.

▲ **Ga., Decatur**—SHOPPING CENTER—McIntyre Realty Co., Healey Bldg., Atlanta, plans by Willner & Millkey, 761 Peachtree St. N. E., Atlanta, 160,000 sq. ft. shopping center, corner Flat Shoals Ave. S. E. and Fayetteville Rd. S. E. **$1,500,000.**

Ga., LaGrange—SHOPPING CENTER—LaGrange Shopping Center, c/o Heery & Heery, Inc., archt., 1366 Peachtree St. N.E., Atlanta, shopping center. **$400,000.**

Ga., Smyrna—CHAPEL, etc.—King Springs Baptist Church, 519 Manor Dr., plans by Bothwell & Nash, 206 Roswell St., Marietta, chapel, educational bldg. **$400,000.** Brewer & Mundy, 165 Alexander St. N. W., Atlanta, plumbing and heating engrs.

▲ **Hawaii, Honolulu**—APARTMENT, etc.—Lenn Mew, Lum, 733 Onaha St., plans by William Bunnz Au, Rm. 409, Boston Bldg., Honolulu, 12 story, 132 unit cooperative apartment hotel, incl. swimming pool. **$2,000,000.**

▲ **Hawaii, Honolulu**—OFFICE—Victoria Ward Ltd., 1020 Aushi St., plans by Vladimis Ossisoff, FAIA & Assocs., Penthouse-Hawaiian Life Insurance Bldg., Honolulu, 7 story office. **$1,000,000.**

Ill., Lake Villa—HOSPITAL—Countryside Hospital Assn., Grand Ave., and Grub Hill Rd., plans by William Hooper, 520 N. Western Ave., Lake Forest, 25-bed hospital, **$500,000.**

Iowa, Davenport—STORE—National Tea Co., Locust and Brady Sts., store, **$500,000.**

Kan., Wichita—HIGH SCHOOL—Catholic Diocese of Wichita, c/o Feagins, Kirsch & Feagins, archts., 301 Laura St., Catholic high school for boys. **$595,000.**

Kan., Winfield—CHURCH, etc.—Trinity Lutheran Church, 9th and Mound Sts., plans by Caton, Yadon & Potter, 1011 Mound St., church, incl. sanctuary, fellowship hall, trinity school playgrounds, etc. **$460,000.**

La., Shreveport—LIBRARY—Centenary College, Centenary Blvd., plans by Peyton, Fisher & McKelvey, Continental Bank Bldg., 2 story, part bsmnt., 37,000 sq. ft. masonry library. **$640,000.**

Md., Hyattsville — STORE, etc. — Federal City Supply Corp., 1411 K St. N.W., Wash., D. C., plans by Edmund W. Dreyfuss, 1019 15 St. N.W., Wash., D. C., store and warehouse, Chillum Rd. and Queen Chapel Rd. **$500,000.** Howard L. Keller, 8035 13 St., Silver Spring, consult. engr.

Mass., Brookline—APARTMENTS—Owner, c/o Milo Hart Assoc., archts., 471 Broadway, Everett, Mass., 3-24 unit brick apartments. Approx. **$400,000.** Constr. 1960.

Mo., Hazelwood—MOTEL, etc.—Regal Hostelry, Inc., c/o Regal Development Co., Hazelwood Lane and Hy. No. 66, plans by Joseph A. McAuliffe, 9359 Pine Ave., Brentwood, Zone 17, 2 story, 38 unit brick, masonry blocks, concrete, etc., motel; 2 story, 26 unit administration and swimming pool. Over **$500,000.**

Mo., Poplar Bluff—CHURCH—Christian Church of Poplar Bluff, church. **$500,000.**

Mo., Poplar Bluff — CHURCH — Poplar Bluff Baptist Church, church addn. **$500,000.**

Mo., St. Louis—SCHOOL OF DENTISTRY—St. Louis University, 221 N. Grand Blvd., Zone 3, School of Dentistry addn., 3556 Caroline St. **$420,000.**

▲ **Mo., St. Louis County**—Bach Industries, Inc., 7506 Natural Bridge Rd., Zone 21, and Simcock Realty Co., 6379 Clayton Rd., Clayton, Zone 17, plans by Rathert & Roth, 4401 Hampton Ave., St. Louis, Zone 10, 3 story shopping center, to incl. 75,000 sq. ft. Junior department store, 25,000 sq. ft. food store, 15,000 sq. ft. drug store, 1500 car parking, service station, etc. Northwood, Natural Bridge and Lucas and Hunt Rds. Over **$2,000,000.** Constr. in May 1960.

N. J., Oradell—DISTRICT OFFICE—Public Service Coordinated Transport Co., 80 Park Place, Newark, plans by Tectonic Assocs., U. S. Highway 206, Somerville, district office, New Milford Ave., **$700,000.** CD 6/16.

▲ **N. J., Perth Amboy**—HOUSES, etc.—Angelo Call, 1939 Duncan Dr., Scotch Plains, plans by A. S. Benoist & Seymour Goldberg, 488 Brookdale Rd., Union, 179 houses, Florida Grove Rd., **$3,500,000;** shopping center, Convery Blvd., over **$400,000.**

▲ **N. M., Albuquerque**—HOTEL—Central Copper Hotel Corp., C. K. Redd, 214 3rd St. N.W., plans by Ashton & Wilson, 10819 Santa Monica Blvd., West Los Angeles, Calif., 5 story, 174-room, rein.-con., cinder block hotel, Central Ave. between Locust and Elm Sts. **$2,000,000.**

N. Y., New York—APARTMENT—436-42 East 81st Corp., 141 Broadway, Zone 6, plans by Sidney Goldhammer, 44 West 56th St., Zone 19, 6 story apartment, 436-42 East 81st St. **$510,000.**

▲ **N. Y., New York**—APARTMENT—Equity Unlimited, Inc., 575 Madison Ave., Zone 22, plans by Wechsler & Schimenti, 118 E. 25th St., Zone 10, apartment, 141-3 East 32nd St. **$1,100,000.**

▲ **N. Y., New York**—INSTITUTE FOR HEART AND LUNG DISEASES—New York Medical College, 5th Ave. and 106th St., Zone 29, plans by Alexander P. Morgan, 32 E. 57th St., Zone 22, Institute for Heart and Lung Diseases at site. **$5,000,000.**

N. C., Raleigh—MOTEL—J. W. York, 2016 Cameron St., motel, Hillsboro St. **$500,000.**

N. C., Raleigh—OFFICES—Northwestern Mutual Insurance Co., 1005 Harrington St., offices. **$400,000.**

▲ **O., Cincinnati** — BOWLING ALLEY, etc. — Joseph Ruppe Gilbert Seitz, 8015 Plainfield St., 1 story, brick 32-lane bowling alley, restaurant, Compton and Winton Sts. **$1,300,000.** J. S. Wald & Assocs., 2565 W. Galbraith St., North Cherry Hill, consult. engrs. Constr. in Summer.

▲ **O., Cincinnati**—OFFICE—Union Central Life Insurance Co., 5 W. 4th St., plans by Cellarius & Hilmer, 4th and Main Sts., 2 story, bsmnt., brick, stone office, Waycross and Mill Rds. **$6,000,000.** Harley-Ellington-Day, Inc., 153 E. Elizabeth St., Detroit, Mich., consult.-engr.

▲ **O., Columbus**—DORMITORIES, etc.—Capital University, 2199 E. Main St., three dormitories, classroom, field house, natatorium, building expansion. **$4,000,000.** Constr. first unit in 1961.

▲ **O., Dayton**—APARTMENTS—Robert J. & Joseph B. Haverstick, 2412 Far Hills St., three apartments, 1700 block Main St. **$2,500,000.**

▲ **Ore., Milwaukie**—RETIREMENT HOME—Willamette View Manor, 2705 SE River Rd., plans by Leslie E. Poole, Royal Bldg., Portland, 10 story, 400 unit retirement home addn. Over **$5,000,000.** Bids in summer.

▲ **Pa., Phila.** — DORMITORY — Chestnut Hill College, Germantown Ave., plans by Henry H. Dagit & Sons, 1329 Race St., dormitory bldg. **$1,000,000.** McCormick-Taylor Assocs., Suburban Station Bldg., consult. engrs. CD 12/4.

Tenn., Knoxville—MOTEL—Stratton Hotel, 5160 Clinton Pike, 16 unit motel and swimming pool. $400,000.

Tenn., Sewanee—DORMITORIES—University of the South, 1 men's dormitory and 1 women's dormitory. $800,000. CD 2/26/47.

Tex., Beaumont—CLUBHOUSE, etc.—Pinewood Country Club, c/o A. Carroll Brodnax & Associates, archts., 5512 La Branch St., Houston, clubhouse, incl. swimming pool, stables, tennis courts, $400,000.

▲ **Tex., El Paso**—STORE—Popular Dry Goods Co., Texas N Mesa Ave. and San Antonio St., plans by Burke, Kober & Nichols, 2405 W. 3rd St., Los Angeles, Calif., 3½ story store annex, and 6 story store, $2,000,000.

Tex., Hawkins—STUDENT HOUSING—Jarvis Christian College, student housing (CH—Tex 117D). $750,000.

▲ **Tex., Houston**—DWELLINGS—R. F. Beeler, Contractor, & Golfcrest Lumber & Supply Co., 8111 Easthaven Blvd., 31 dwellings, $414,200; 34 dwellings, $428,225; 27 dwellings, $407,500, in "Sequoia Estates" Subdivision.

Tex., Houston—DWELLINGS—Charles V. Blanton, Contractor, 7327 Sandpiper St., 20 dwellings, $440,000; 20 dwellings, $421,250, in Sharpstown.

Tex., Houston—DWELLINGS—J. A. Hendon, Contractor, 4103 Lanark Lane, 14 dwellings, in Sharpstown Subdivision, $410,000. Constr. 1960.

Tex., Houston—DWELLINGS—Claude Hooten, Jr., Constr. Co., 7302 Sandpiper St., 17 dwellings, in Sharpstown Subdivision, $416,000.

Tex., Houston—HIGH SCHOOL—Lutheran High School Assn., c/o Travis Broeshe & Associates, archts., 3271 W. Alabama St., masonry high school, W. 34th and Puls Sts. $500,000.

▲ **Tex., Houston**—DWELLINGS—Jas. E. McDaniels & Frank Thielen, Contractors, c/o 9507 Braeburn Glen; 34 dwellings, $428,115; 31 dwellings, $415,500; 29 dwellings, $405,000; 36 dwellings, $437,150; 39 dwellings, $444,450, Sheldon Rd. & Hgy. 90.

▲ **Tex., Houston**—DWELLINGS—M. P. Moore, Contractor, 7050 Sharpcrest St., 24 dwellings, $446,175; 22 dwellings, $437,000; 20 dwellings, $429,450; 18 dwellings, $416,225; 16 dwellings, $405,000, in 4000-acre Sharpstown Subdivision.

▲ **Tex., Houston**—OFFICE, etc.—University Savings & Loan Assn., 6135 Kirby St., plans by Bank Bldg. & Equipment Corp., 906 Sidney St., St. Louis, Mo., brick, air-conditioned office, 8 levels, penthouse, 300 car garage, Dunstan, Kelvin and Tangley Sts., $2,500,000.

▲ **Tex., Houston**—DWELLINGS—T. E. Webster, Contractor, 7127 Neff St., 25 dwellings, $421,325; 28 dwellings, $437,700; 27 dwellings, $414,000; 20 dwellings, $459,500, Sharpstown Subdivision. Constr. 1960.

▲ **Tex., Houston**—DWELLINGS—J. G. Wilkerson, Builder, 7031 Sharpcrest St., 19 dwellings, $468,000; 24 dwellings, $431,875; 21 dwellings, $422,100; 28 dwellings, $416,500; 18 dwellings, $409,600, in Sharpstown.

Tex., Houston—HOSPITAL—Memorial Hospital, 602 Lamar St., hospital wing addn., $500,000.

Tex., Kenedy—SHOPPING CENTER—Joel A. Austin & Lee Roy Hallemann & Associates, Alice, shopping center, $400,000.

Tex., San Antonio—SCHOOL—Alamo Hgts. Ind. School Dist., 150 E. Fair Oaks St., voted Bonds Feb. 27, school, $400,000. CD 2/18.

Tex., San Antonio—DWELLINGS—Burke Homes, 1100 Goliad Rd., 34 dwellings, $418,200; 38 dwellings, $438,100, Highland Hills.

Tex., San Antonio—DWELLINGS—Melson Puett & Associates, 115 Oak Glen St., 18 dwellings, Northwood Terrace Subdivision. $416,000.

Tex., San Antonio—DWELLINGS—Quincy Lee Constr. Co., 7303 San Pedro Ave., 35 dwellings, in Greenbriar Subdivision. $431,115.

Tex., Sweetwater—BOWLING CENTER, etc.—Owner, c/o S. J. May, Sweetwater, bowling center and motel. $400,000.

Va., Halifax—HOUSES—Walter W. Hooper (Cantebury Estates), Halifax, 42 house subdivision. $840,000.

Va., Virginia Beach—MOTEL—C. J. Lindemann Corp., 4005 Gosnald Ave., Norfolk, plans by Shriver & Holland, Flat Iron Bldg., Norfolk, 6 story, 54 unit motel. $500,000.

▲ **Wash., Seattle**—RETIREMENT HOME—Washington Congregational Christian Conference, 720 14th Ave. N., plans by Durham, Anderson & Freed, 1100 Denny Way, Seattle, Wash., 12 story retirement home. $4,000,000.

▲ **Wis., Madison**—HOUSING—B. Romnes, 4215 Wanetah Trail, plans by Wecler & Strang & Assocs., 810 University Bay Dr., 84 unit housing project. $1,078,000.

Wis., Milwaukee—OFFICE—N. S. Abrahams, 6728 W. Capitol Dr., plans by Rasche, Schroeder & Sprausy, 601 W. Capitol Dr., office, $550,000.

Newfoundland, St. John's—BANK—Bank of Montreal, 119 St. James St. W., Montreal, Que., bank, Water St. Over $400,000.

Ont., Orillia — HOSPITAL — Orillia Soldiers' Memorial Hospital Bd., 179 Colborne St. W., plans by Page & Steele, 72 St. Clair Ave. W., Toronto, 60-bed hospital addn. $750,000.

Ont., Pembroke—HOSPITAL—Pembroke Cottage Hospital Bd. plans by Drever & Smith, 81 Brock St., Kingston, 3 story hospital addn. $775,000.

Ont., Toronto—SHOPPING CENTER—Centario Investment Ltd., Crestview Plaza, Port Credit, plans by Crang & Boake, 79 Huntley St., 75,000 sq. ft. shopping center, Park Royal Development, Clarkson Rd. $500,000.

Ont., Toronto—MISSION—Scott Mission, Inc., 502 Spadina Ave., mission, 502 Spadina Ave. $780,000.

Ont., Toronto—APARTMENT—Stanjac Constr. Ltd., 51 Gamble Ave., plans by Marcel Goldhagen, 234 Homewood Ave., 6 story masonry apartment, Kennedy Rd. $400,000.

Ont., Whitby—SHOPPING CENTER—Farmland Developments Ltd., c/o Zurich Consultants, archts.-engrs., 8 Bedford Rd., Toronto, shopping center, Dundas Sq., 72-unit apartment. $500,000.

Que., Drummondville — SPORTS CENTRE — Centre des Loisirs de Drummondville, Inc., 815 St. Alfred St., plans by Audet & Blais, 436 Lindsay St., sports centre, Heriot St. Over $400,000.

Que., Montreal—COLLEGE—College Ste. Marie, 1180 Bleury St., two 10 story college addns., at Bleury, Corchester and St. Alexander Sts. Over $500,000.

Que., Terrebonne—JUVENAT—Rev. Peres du Tres Saint Sacrement, near Main Rd., plans by Gilbert Moreau, 210 Cremazie Blvd. W., Montreal, juvenat extension, $500,000.

INDUSTRIAL BUILDINGS

Ala., Irondale—PLANT—Transall, Inc., 109 11 Ave. N., plans by Edward J. Bondurant, 2412 Fairway Dr., Birmingham, Zone 9, steel, masonry mfg. plant addn. $150,000.

Ark., Brinkley—PLANT—Brinkley Industrial Development, c/o Bank of Brinkley, 1 story, 90,000 sq. ft. plant to mfg. fractional horsepower electric motors. $900,000. Wagner Electric Corp., 6400 Plymouth Ave., St. Louis 33, Mo., lessee.

▲ **Ark., Crossett**—PLANT—Crossett Lumber Co., Crossett, plant to produce 100 tons medium density board daily from gum wood, $6,000,000. Ford, Bacon & Davis, Inc., 39 Broadway, New York, N. Y., consult. engr.

▲ **Colo., Denver**—PLANT—The Denver Post, 15 and California Sts., plans by Buell & Co., 730 14 St., Denver, 2 story, paper plant expansion. $1,000,000.

Conn., Bloomfield—PLANT—Kaman Aircraft Corp., Old Windsor Rd., plant, Blue Hills Ave. $460,000.

▲ **Conn., Bristol** — MANUFACTURING, etc. — Superior Electric Co., 83 Laurel St., plans by Westcott & Mapes, Inc., 109 Church St., New Haven, 1 story, 300,000 sq. ft. masonry mfg. and office bldg. $3,000,000.

Conn., Cheshire—PLANT—New England Gear Works, S. End Rd., Southington, 120,000 sq. ft. plant, E. Johnson Ave. $120,000.

Conn., Meriden—PLANT—Russell L. DeMarco, Agt., 607 E. Main St., plant, Quarry Lane. $110,000.

Conn., South Norwalk—PLANT—Sorensen & Co., Inc., Keeler Ave., plant addn., Keeler Ave. $110,000.

▲ **Fla., Tampa**—PLANT—Tennessee Corp., Grant Bldg., Atlanta, Ga., 100 tons annual capacity fertilizer plant. $11,000,000.

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▲ **Ga., Augusta**—PLANT—Deerfield Glassine Co., Monroe Bridge, Mass., mfg. plant. $1,000,000.

▲ **La., Chalmette**—REFINERY—Bay Petroleum Co., Div. Tennessee Gas Transimssion Co., Tennessee Bldg., Houston, Tex., petrochemical aromatics refinery unit. $2,500,000.

▲ **La., New Orleans**—PLANT—Bay Petroleum Co., Div. Tennessee Gas Transmission Co., Tennessee Bldg., Houston, Tex., 2,000 bbl. daily petrochemical aromatic unit, near here. $3,000,000.

La., Shreveport—PARKING GARAGE—Owner, c/o Peyton, Fisher & McKelvey, archts., Continental Bank Bldg., 4 story parking garage. $300,000.

Me. South Portland—INDUSTRIAL—ADC Building Fund, Inc., c/o Engineering Services, Inc., consult. engr., 844 Stevens Ave., Portland, shell for 48,000 sq. ft. industrial bldg. $250,000. Constr. in April or May.

Mass., Canton—INDUSTRIAL PLANT—Draper Bros., Draper Lane, cloth manufacturing plant, $150,000. Steco Engineering Corp., 1051 Turnpike St., Canton, Mass., engr. Constr. 1960.

▲ **Mass., Easton** — INDUSTRIAL PARK — A. A. Will Corp., 1051 Blue Hill Ave., Milton, industrial park. $1,000,000. Steco Engineering Corp., 1051 Turnpike St., Canton, engrs. Constr. 1960.

Mass., Roslindale—MANUFACTURING PLANT—Barnstead Still & Sterilizer Co., 2 Lanesville Terrace, plans by L. C. Roy, 9 Arlington St., Boston, manufacturing plant addn., alterations, Forest Hills Section. $175,-000. Bids in April.

Mo., St. Louis—PARKING GARAGE—Wayco Petroleum Co., 611 Olive St., Zone 1, five level, 93x200 ft. 500-car parking garage, NE corner Broadway and Washington Ave. $750,000. Constr. in 1961.

▲ **N. J., Totowa**—BAKER—Thomas Bread, Inc., 33-01 Queens Blvd., Long Island City, N. Y., bakery, Riverview Dr., $2,500,000.

N. C., Albemarle—PLANT, etc.—Collins & Aikman Corp., Salis Rd., automotive carpeting plant and office addn. $500,000.

N. C., Marion—PLANT—McDowell Development, Marion, 40,000 sq. ft. mfg. plant, $250,000. Washington Mills Co., lessee.

O., Dayton—SALES and SERVICE—Motor Imports, Inc., 431 Wayne St., 12,000 sq. ft. sales and service, Wilmington Pike. $125,000. Constr. in Spring.

Pa., North Wales—PLANT—Precision Tube Co., Inc., plans by E. Lane Crawford, Montgomery-Norristown Bank Trust Bldg., Norristown, 1 story 160x160 ft. masonry industrial plant addn. $200,000.

Pa., Phila.—PLANT—Luzerne Enterprise, Inc., 1420 Walnut St., 1 story, 63,000 sq. ft., masonry food processing plant. $500,000. Quaker Salad Co., Inc., 454 N. 9 St., Phila., lessee.

▲ **Pa., Wayne**—PLANT—Wayne Iron Works, plans by George M. Ewing Co., Western Savings Fund Bldg., Phila. mfg. plant, $1,000,000. CD 12/17.

▲ **Tenn., Copperhill**—PLANT—Tennessee Corp., Grant Bldg., Atlanta, Ga., liquid sulfur dioxide plant addn. $1,000,000.

Tenn., Somerville—FACTORY—Salant & Salant Co., clothing factory, $450,000.

Tex., El Paso—PLANT—Union Mfg. Co., 801 Texas St., 2 story, 40,000 sq. ft. plant, 2-acre site, Octavia and Mills Sts. $325,000.

Tex., Houston — PLANT EXPANSION — General Metals Corp., c/o Liberty Rd., forge plant expansion. $250,-000.

Tex., Houston—ABATTOIR—Lone Star Packing Co., 2701 Porter St., abattoir, $200,000.

▲ **Tex., Rockport**—PLANT ENLARGEMENT—Bay Petroleum Co., (Div. of Tennessee Gas Transmission Co.) Tennessee Bldg., Houston, gas processing plant addn. $1,250,000.

Tex., Sherman—PLANT—Sherman Industrial Dists, Inc., 46,000 sq. ft. manufacturing boats plant, 6 acres tract. $250,000.

▲ **Wash., Spokane**—WAREHOUSE—United Retail Merchants Inc., E108 Jackson St., 280,000 sq. ft. grocery warehouse, $1,750,000. Constr. in Spring.

Wis., Brookfield—WAREHOUSE-OFFICE—Crown Screw & Bolt Co., 3816 W. North Ave., Milwaukee, plans by Myles Belongia, 11516 W. Blue Mound Rd., Wauwatosa, Zone 13, 1 story, bsmnt., 25,000 sq. ft., concrete, brick, blocks warehouse-office, $250,000. Bids soon.

▲ **Wis., Milwaukee**—LABORATORY, etc.—Johnson Service Co., 507 E. Michigan St., laboratory and parking area. $2,500,000. Constr. 1960 or 1961.

Alta., Stratchcona—PLANT—Dominion Rubber Co. Ltd., 550 Papineau Ave., Montreal, Que., plant, Over $150,000.

Ont., Ilderton—PLANT—Ilderton Farmers Cooperative, fertilizer plant, $100,000.

Ont., London—PLANT—Concrete Pipe Ltd., 48 St. Clair Ave. W., Toronto, concrete pipe mfg. plant. $125,000.

Ont., Stratford—PLANT—Sealed Power Corp., King St., plans by Gordon Ritchie, 29 Downie St., 1 story, 101 x 192 ft., brick, steel, cement block plant addn. $135,000.

Ont., Toronto—PARKING GARAGE—The Robert Simpson Co. Ltd., 176 Yonge St., 8 level, ramp-type parking garage, Richmond St. W. $500,000.

▲ **Ont., Toronto** — PLANT — English Electric Co. of Canada Ltd. and John Inglis Co. Ltd., 14 Strachan Ave. W., plans by Allward & Gouinlock, 245 Davenport Rd., 140,000 sq. ft. plant, Eglinton Ave. E. $2,000,-000.

▲ **Que., St. Felicien**—PLANT—Sulphur Converting Corp., Roberval, smelting plant, $40,000,000. Constr. in June.

UNCLASSIFIED

▲† **Alaska, Adak**—EXTENSION OF DEW LINE—P. Wks. Office, 13th Naval Dist., Naval Station, Seattle, Wash., Blue Grass Project: extension of DEW line. $7,000,000.

Calif., Pasadena—PRESS BOX—City, City Hall, plans by Bred Freeman, 45 S. Marengo Ave., press box, Rose Bowl. $200,000.

Conn., Greenwich—EDUCATIONAL TELEVISION NETWORK—Town, Town Hall, educational television network for Greenwich Public School System. $125,000.

Conn., Trumbull — UNDERGROUND TANKS — Bridgeport Gas Co., 815 Main St., Bridgeport, liquid propane gas underground tanks and control bldg., Fodor Lane. $600,000. Drake & Townsend, Inc., 11 W. 42 St., New York, N. Y., consult. engr. CD 12/18.

Ga., Brunswick—BOATING FACILITIES—Bell Point Yacht Club, c/o Akel, Bell & Pearson archts., 237 W. Forsyth St., Jacksonville, Fla., boating facilities. $250,000.

Iowa—TELEPHONE LINES—South Hardin Rural Telephone Co-operative, Union, 84 mi. telephone lines and 90 mi. line rebuilding, Hardin Co. $100,000.

▲ **Louisiana**—GAS LINE—Trunkline Gas Co., Bank of Commerce Bldg., Houston, Tex., gas line supply lateral: 17 mi. 24 in. loop and 123 mi. 20 and 26 in. loop, North and West, New Orleans. $4,370,000. Constr. 1960.

Mass., Grafton—FIRE PROTECTION—Commonwealth of Mass., Dpt. Mental Health, c/o Div. Bldg. Constr., 38 Chauncy St., Boston, plans by John Guarino 2 Lexington St., East Boston, Proj. M-711-(a) fire protection, State Hospital. $100,000-$150,000. Constr. 1960.

Minn., Richfield—SWIMMING POOLS—Bd. Educ. Independent School Dist. No. 280, defeated $360,000 bonds Feb. 16, swimming pools. CD 1/28.

N. J., Secaucus—PARK, etc.—Town, Town Hall, park adjoining public library, incl. walks, tennis and basketball courts, ice and roller skating rink and landscaping. $300,000. Joseph Lynch, Town Hall, engr.

▲ **O., Cleveland**—SWIMMING POOLS—Dpt. P. Properties, City Hall, Zone 14, twelve swimming pools, at Sunrise, Impett, Lake, Warsaw and Regent in 1961; Mandalay, Grant, Glendale, Meyer, near Miles in 1962; Garden Valley and Sandusky in 1965, $1,440,-000. CD 11/9.

Oklahoma—PUMP STATION—Okan Pipeline Co., 1350 S. Boulder St., Tulsa, Okla., gas turbine pump station, Goltry. $345,000.

▲† **Pennsylvania**—SUPPORT FACILITIES—U. S. Eng., 925 New Federal Bldg., Pittsburgh, Zone 19, support facilities, Missile Master, (A) 2 story barracks and 1 story barracks, 33 x 220 ft., (B) 2 story, 33 x 102 ft. bachelor officers quarters, (C) 1 story, 48 x 110 ft. mess hall, (D) 2 story, 47 x 220 ft. headquarters bldg., (E) 1 story, 50 x 150 ft. engineer field maintenance and R & U shop, (F) 1 story, 100 x 185 ft. combined warehouse, (G) 1 story, 60 x 85 ft. motor vehicle repair shop, (H) 1 story, 30 x 52 ft. cold storage bldg., (I) 1 story, 55 x 138 ft. exchange sales store, (J) 1 story, 34 x 68 ft. central heating plant, (K) 100 x 100 ft. helicopter pad, (L) fencing, flagpole, roads, parking areas, water sewer, gas, electric and steam distr. lines site imprvs., Pittsburgh Defense Area, FY 1960 program, Noblestown Rd. and Thoms Run-Oakdale Rd., Collier Twp., Allegheny Co., ENG-36-058-60-21. $3,000,000.

Pa., Erlton — SWIMMING POOL — Cherry Valley Swim Club, c/o Howard O. Krasnoff, archt., 532 Glenmore Ave., swimming pool and bathhouse. Bids about Mar. 15.

R. I., Narragansett—SWIMMING POOL—Town, Beach Comn., Town Hall, swimming pool. $150,000. Constr. 1960. Benson Engineered Products, Inc., 169 New London Ave., Cranston, planners.

Tex., Austin—GOLF COURSE, etc.—City, City Hall, 18-hole golf course, $125,000; park work and swimming pool, $200,000. CD 5/17/56.

Tex., Beaumont—GOLF COURSE—Pinewood Country Club, c/o Leon Howard and Henry Ransom, archts., 5512 La Branch St., Houston, 18-hole golf course. $110,-000.

Wis., Watertown—LIGHTING—City, City Hall, grading, paving lighting airport. $304,000. Mead & Hunt, 2320 University Ave., Madison, engrs. Constr. 1960. CD 1/26/45.

Ont., Alfred—SWIMMING POOL—Les Freres des Eccles Chretiennes plans by Louis J. LaPierre, 339 Fleury St. W., Montreal, Que., swimming pool, $250,000.

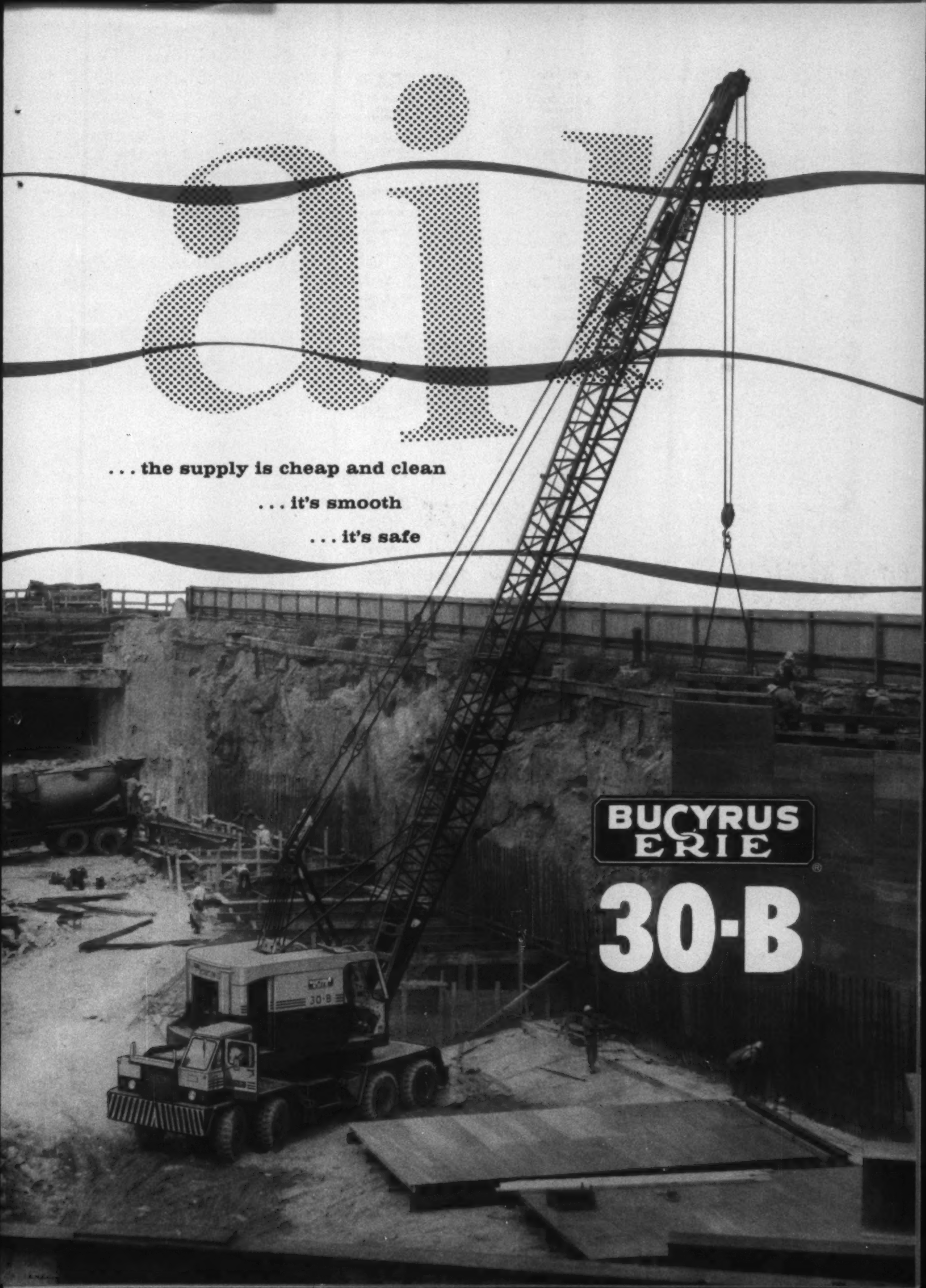
Ont., Fort William—HARBOR IMPRVS.—Dpt. P. Wks., Hunter Bldg., Ottawa, harbor imprvs. $385,000.

Ont., Hamilton—HARBOR—Dpt. P. Wks., Hunter Bldg., Ottawa, harbor repairs and imprvs. $902,000.

▲ **Ont., Port Arthur**—HARBOR IMPRVS.—Dpt. P. Wks., Hunter Bldg., Ottawa, harbor imprvs., Lakehead (Port Arthur-Fort William) area. $3,730,000.

Ont., Port Stanley—HARBOR REPAIRS, etc.—Dpt. P. Wks., Hunter Bldg., Ottawa, harbor repairs and imprvs. $180,000.

Ont., Wallaceburg—HARBOR IMPRVS.—Dpt. P. Wks., Hunter Bldg., Ottawa, harbor imprvs. $222,000.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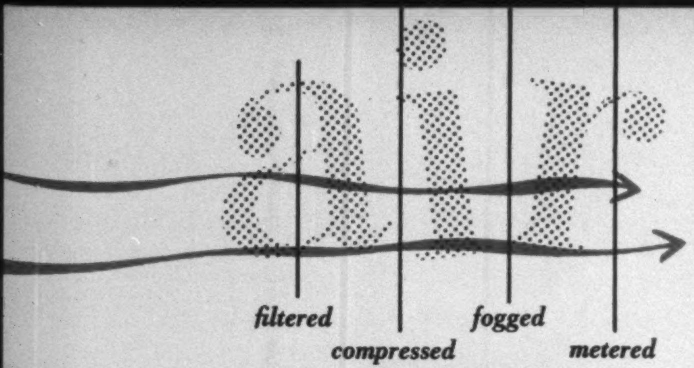

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"Engineered" air? Take a look! Bucyrus-Erie filters air to make it clean — to keep your lines clean; anti-freezes it to keep it working for you in coldest weather; compresses it to make it do more work for you; fogs lubricant into the air to keep cylinders alive longer; meters it out in just the amounts you want — no sudden bursts.

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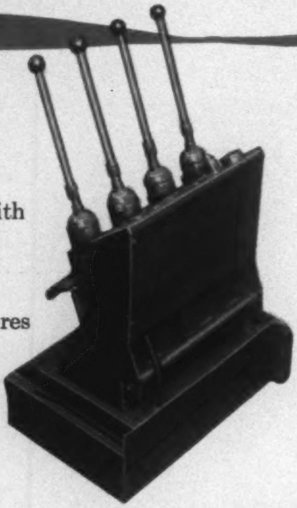
MICRO-SET SWING CLUTCHES TO SUIT THE OPERATOR

Every operator works differently, with a different touch. Here's a machine that lets the operator set the "feel" of the swing clutches just the way he wants it! Once control pressures are set, he gets the benefit of metered control valves, graduated to give him all the precision and sureness he needs on the tough jobs.



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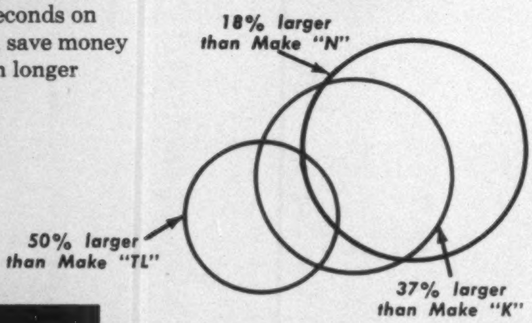
The Bucyrus-Erie 30-B was *designed* for air, not adapted for it! You don't have an oversize compressor to rob you of engine power. The simplicity of the system eliminates return lines, minor leaks are no longer a major problem, no special servicing is required to keep the system in top-notch operating condition. Anti-icer in the system prevents lines from freezing in cold weather!

item two:

BUCYRUS-ERIE 30-B SWING CLUTCHES ARE FROM 18 TO 50% BIGGER THAN COMPETITION

But that's not all — they're two-section giants designed to engage a split second apart, smoothly, positively. You save seconds on every cycle, save money and time on longer clutch life!



item four:

QUICK-SHIFT SWING TO PROPEL

Air power again goes to work to speed up the operation on a 30-B crawler excavator! With the move of one lever, the operator can shift from swing to propel and back again, a real timesaver on trenching jobs. You get many of the advantages of independent propel without the extra cost. If you need independent propel you can get it with the 30-B.

30-B

***SINGLE-LEVER CLAMSHELL CONTROL** now available on big Bucyrus-Erie 30-B to make entire operation more efficient!*

Bucyrus-Erie air control on the 30-B can make new men of your operators because the machine is so easy to control all day long. 30-B air control will make new operators of your most skillful men, too, because the machine is so simply controlled, giving them confidence unknown before. You owe it to yourself to take a close look at what the Bucyrus-Erie 30-B air control does in action . . . how other functions of the machine are coordinated to make this the finest machine its size you can consider!

item five:

SMOOTH, POSITIVE, INDEPENDENT AIR BOOM HOIST

Here's a high-speed boom hoist that's safe, sure and quiet! The 30-B single-lever, full air-controlled boom hoist *powers boom up . . . powers boom down* through big friction clutches — hoists without complicated, auxiliary units! Optional equipment gives you additional variable speed control for specific special applications. Graduated valve on air control lets you engage and disengage as gently as a hand operation!

item six:

GEARS ALWAYS LUBRICATED BECAUSE THEY "FLOAT" IN OIL

Gear life can be directly dependent on the amount of care and attention given to periodical lubrication. With the Bucyrus-Erie 30-B, gear lubrication is *automatic* because all gears on the machinery deck are enclosed and running in oil. The deck stays clean, the gears last years longer, you put extra profits in your pocket through time saved, parts costs eliminated.

These are some of the reasons why experienced men say, "We've got real confidence in this rig!"

See who said it, and why• • • • •

30-B

**J. E. Hocutt, 13 years an operator of all kinds of excavators.
R. G. Brown, Jr., & Company, Louisville, Miss.**

"It's a dandy machine, no two ways about it! This 30-B's the easiest machine to operate that I've ever worked. Those air controls do the trick in *any* kind of digging!"

This 30-B is loading fill for an Interstate project, loads nine rear-dump trucks — fills one every 35 to 45 seconds (three passes). Machine has never been down, operates almost continuously.

Gerosa Crane Service Co., Inc., Bronx, N.Y.

Operator stated, "Even with this load I have every confidence that it will be handled without trouble! On these lifts, loads were boomed out twenty feet to clear the wall and no tilt showed in the chassis — and in spots we were working on pretty soft ground."

Gerosa's 30-B placed three Murray boilers — weight 28 tons each — from flat cars to trailers, removed and placed them at the new IBM Research Center, Yorktown, N.Y.

Willard F. Stoneburner, operator, Murphy Bros., Spokane, Wash.

"Operating a 30-B is easy. All you have to do is sit there and guide it."

This is the third 30-B purchased by Murphy Bros. in 1½ years. Machine is digging 12 to 15 feet, through dirt and hardpan, for installation of 30-in sewer pipe averaging over 200 feet per day.

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Bucyrus-Erie distributors can be a big factor in profits from your machines. Consider these facts, and call on your local distributor or on Bucyrus-Erie Company at any time for the kind of service that puts profit-insurance into every assignment!

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South Milwaukee, Wisconsin

Bids—Low Bids—Contracts—Second Section

NEW ENGLAND

BUILDINGS—BA

R. I., **Providence**—AUDITORIUM—BA 4/6—Brown University, Prospect St. (selected list of bidders), skating rink and auditorium, Aldrich, Dexter Feld, Hope St. and Lloyd Ave. $800,000. Perry, Shaw, Hepburn & Dean, 31 St. James Ave., Boston, Mass., archts. CD 1/6.

R. I., **Kingston**—DORMITORIES—BA 4/7—State R. I. & Prov. Plants, Div. Purchase, State House, Providence, 2 women's dormitories, University of Rhode Island. $800,000-$1,000,000. Plans deposit $100. Extended date. Harkness & Geddes, 17 Custom House St., Providence, archts. CD 2/24.

▲ Vt., **Burlington** — DORMITORIES — BA 4/14 — University of Vermont, men's dormitory, incl. Dining Hall, approx. $900,000; Women's Dormitory, approx. $500,000. Freeman, French & Freeman, 158 Bank St., Burlington, archts. CD 5/6/58.

HEAVY CONSTRUCTION—LB & CA

MASSACHUSETTS—Commonwealth of Mass., Dpt. Wks., 100 Nashua St., Boston, Bids opened 3/15,

Coleman Bros. Corp., 85 Sprague St., Readville, Mass., LB **$945,469**, est. $1,061,511, wid'n. Section Rte. 128 and incl. three bridges, FAP-U-272 (4), Lynnfield and Wakefield. CD 3/10.

▲† **Gil Wyner Co., Inc.**, 12 Newland St., Malden, Mass., LB **$1,124,422**, Westville Dam, Quinebaug River, Thames River Basin, Southbridge and Sturbridge, CIVENG-19-016-60-27, MASSACHUSETTS. U. S. Eng., 424 Trapelo Rd., Waltham 54, Mass. Bids Mar. 15. CD 2/23.

Abting Realty Co., c/o J. F. Buchini, 294 Washington St., Boston, Mass., Owner Builds, Approx. **$405,000**, (3rd section), 23 HOUSES "Apple Hill Estates", Phelps St., MARLBORO, MASS.

CONNECTICUT—State Hy. Comr., 170 Douglas St., Hartford,

Zaist Bros., Box 73, Oakdale, Conn., CA **$733,170** Proj. 104-29, 6,700 lin. ft. hot c. conc. pavement relocation Rte. 156, incl. 3 bridges, Fed. Aid Proj. S-11 (4) Old Lyme, Bids Feb. 8, awarded Mar. 14. CD 2/11, under LB.

▲ **Vara Constr. Co.**, 718 Huntington Ave., Boston, Mass., LB **$2,769,000**, (10 bidders), HIGH SCHOOL, ENFIELD, CONN. Town, Town Hall, N. Main St; Thompsonville, Conn. Bids Mar. 15. CD 2/18.

▲ **F. H. McGraw & Co.**, 780 Windsor St., Hartford, Conn., CA **$20,000,000**, 2 OFFICE BLDGS. and GARAGE, East Side Redevelopment Project, HARTFORD, CONN. Constitution Plaza, Inc., 111 Talcott St., Hartford, Conn. Charles D. DuBoise, 95 Woodland St., Hartford, Conn., archt. Emery Roth & Sons, 575 Madison Ave., New York, N. Y., assoc. archts. CD 11/20/58.

BUILDINGS—LB & CA

Owner, c/o Beatrice K. Williams, Big Red House on Common, Medfield, Mass., Owner Builds, Approx. **$400,000**, (2nd section), 16 HOUSES "Country Acres" off Phillip St., MEDFIELD, MASS.

Kaman Aircraft Corp., Old Windsor Rd., Bloomfield, Conn., Owner Builds, **$460,000**, 51,000 sq. ft. PLANT for static test and flight test and hangar bldg., Blue Hill Ave., BLOOMFIELD, CONN. CD 3/7.

▲ **Fusco-Amatruda Co.**, 59 Amity Rd., New Haven, Conn., CA **$1,500,000**, 150,000 sq. ft. masonry, steel on concrete slab "HAMDEN MART," Second Section, 2300 Dixwell Ave., HAMDEN, CONN. Hamden Mart, Inc., 2300 Dixwell Ave., Hamden, Conn., Rossetti & Miletto, 185 Main St., Bristol, Conn., archts.

▲ **Joseph F. Carabetta & Bros.**, 47 Hill St., Meriden, Conn., Owner Builds, **$1,850,000**, 74 HOUSES "Tanglewood Estates," MERIDEN, CONN. CD 10/6.

Westfield Terrace Corp., Milton Drive, Meriden, Conn., Owner Builds, **$488,000**, 32 HOUSES, Milton Drive, Bee St. and Gale Ave., MERIDEN, CONN. CD 10/6.

Ahearn Development Co., E. Center St., Wallingford, Conn., Owner Builds, **$660,000**, 66 HOUSES, "Saw Mill Estates," East Side, WALLINGFORD, CONN. CD 10/6.

MIDDLE ATLANTIC

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
April 22 Pennsylvania

STREETS AND ROADS
March 29 Maryland, New Jersey April 6 New Jersey
April 22 Pennsylvania

▲ N. Y., **Rochester**—BA 4/13—City, Purchasing Agent, Rm. 36, City Hall, No. 20 South Fitzhugh St., Zone 14, Stage 3, four contracts, Durand-Eastman Main Sewage Treatment Plant addns. sludge digestion, grit and screenings, handlings facilities. $1,500,000. Plans deposit $100. Nussbaumer, Clarke & Velzy, 327 Franklin St., Buffalo, N. Y., consult. engrs. CD 3/11 under LB.

New York—BA 4/21—Power Authority of State of New York, The Coliseum Tower, 10 Columbus Circle, New York, Zone 19, electrical work, incl. but not limited to installation of authority furnished equip. and materials consisting of all generator/motor auxiliaries, main power transformers, isolated phase bus, generator/motor air circuit breakers, secondary unit substations, motor control centers, unit control boards and appurtenances, control batteries and associated equip., lighting sys. and insulated wire and cable, etc. Tuscarora Power Plant, Lewiston, Niagara Co. Spec. No. PA-N-25032, Niagara Contr. No. N27. Plans $20 per initial set, $10 per set for addnl. sets, not refundable. Uhl, Hall & Rich, 230 Congress St., Boston 10, Mass., engrs. CD 8/15/57.

BUILDINGS—BA

N. Y., **Copiague**—SCHOOL—BA 4/12—Bd. Educ., Junior-Senior High School alterations, addns., Deauville Gardens. $550,000. Knappe & Johnson, 2110 Northern Blvd., Manhasset, archts. CD 3/4.

D. C., **Wash.**—BIOLOGY BLDG.—BA 4/13—Catholic University, 620 Michigan Ave. N. E. biology bldg. Locraft & Assocs., 1518 P St. N. W. archts.

HEAVY CONSTRUCTION—LB & CA

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany,

N. Y.—**Hogeboom & Campfield, Inc.**, Seneca Turnpike, New Hartford, N. Y., CA **$1,086,769**, est. $1,497,000, b. conc. 6.48 mi. repair exist. Br. No. 1 Port Crane-North Genton SH 963, Rte. 369, FARC 60-10. Proj. S-815 (2), Broome Co.;

N. Y.—**Depew Paving Co., Inc.**, 161 Woodlawn Ave., Depew, N. Y., CA **$1,638,600**, est. $1,837,000, b. conc. 1.88 mi. misc. work 0.07 mi. extension rein.-con. twin box bridge city of Niagara Falls; Hyde Park Blvd. (B St. to Jerauld Ave.) FAC 60-14. Proj. U-1128 (2), Niagara Co.;

N. Y.—**Louis Mayersohn, Inc.**, 50 State St., Albany, N. Y., CA **$940,645**, est. $1,364,000, b. conc. Type 1A 8.26 mi. misc. work 0.04 mi. Madrid-Waddington Pt. 1 SH 1262, Madrid-Waddington, Pt. 2, SH 966, Waddington Village, SH 1126. Rte. 345, FARC 60-5 Proj. S-110 (2), St. Lawrence Co. Grand total, $3,660,014. Bids Feb. 4, awarded Mar. 10. CD 2/5, under LB.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, Bids opened 3/17,

N. Y.—**Johns Bros. Constr. Co., Inc.**, 37 Hall St., Binghamton, N. Y., LB **$1,097,365.75**, (16 bidders), est. $1,442,000, b. conc. 4.631 mi. Br. 1 twin box rein.-con. 6.2 ft. x 12 ft. Br. over Erie R.R. and Creek compl. I-beam 4 spans 280.8 ft., Friendship-Belmont, SH 5341, Belvidere-Transit Bridge-Angelica, SH 1260, Rte. 19, 408, FARC 60-18, Proj. F-FG 332(8), Alleghany Co.

N. Y.—**County Asphalt**, 129 Main St., Tarrytown, N. Y., LB **$727,688**, est. $804,000 (2 bidders), b. conc. 6.68 mi. Walton-Downsville Pt. k, SH 8515, Walton-Downsville, Pt. 2, SH 48-18, Rte. 205, FARC 60-23, Proj. S-44(6), Delaware Co.

N. Y.—**The Callanan Rd. Imp. Co.**, South Bethlehem, N. Y., LB **$148,312**, est. $186,000 (5 bidders), b. conc. 1.08 mi. Washington Hollow-Millbrook, SH 609, Millbrook Village, SH 114, Rte. 44, R.C. 60-24, Dutchess Co.

N. Y.—**The Callanan Rd. Imp. Co.**, Quarry St., South Bethlehem, N. Y., LB **$168,934**, est. $219,000, (7 bidders), b. conc. 1.08 mi. Amenia-Pine Plains, Pt. 2, SH 5628, Lafayette-Pine-Plains-Winchell, Pt. 1, SH 1313, Rte. 199, 82 FARC 60-20, Proj. F-594(4), Dutchess Co.

N. Y.—**Depew Paving Co., Inc.**, 161 Woodlawn Ave., Depew, N. Y., LB **$553,377.50**, est. $629,000, (3 bidders), b. conc. 1.18 mi., misc. work 0.05 mi. Williamsville Village, SH 5061 Main St., Pt. 2, SH 87, Rte. 5, FARC 60-19, Proj. F-933(6), Erie Co.

N. Y.—**Johnson, Drake & Piper**, 86 Trinity Pl., New York 6, N. Y., LB **$3,475,046.90**, est. $4,132,000, (10 bidders), b. conc. 0.79 mi., misc. work 0.1 mi. demolish, grad. 1.85 mi. 4 hy. gr. seps. 1 Bd. comp. I-beams, 7 spans, 371.0 ft., 1 sp. 76.5 ft., 1 sp. 86.4 ft., 1 span 72.1 ft., 2 sps. 136.0 ft. Rochester City, Innerloop (Front St. to North St.) Rochester Outerloop, (Winton Rd. south-Highland Ave.) FAC 60-7 FASH 60-2, Proj. U-1089(13), U 1093(7), Monroe Co.

N. Y.—**Meadow Brook Nurseries, Inc.**, Englewood, N. J., LB **$253,986.50**, est. $262,000, (2 bidders), roadside development access ramps delineators and misc. work Horace Harding Expressway Ext. New York City-Nassau Co. Line to Guinea Woods Rd., FAHHE 60-2, Proj. U-862(26), Nassau Co.

N. Y.—**Gara Contrac., Inc.**, Hicksville, L. I., N. Y., LB **$3,492,637.10**, est. $4,110,000, (8 bidders), Long Island Expressway from Round Swamp Rd. to Pinelawn Rd., grade separations at Round Swamp Rd., Whitman Rd., Rte. 110 and Pinelawn Rd., Nassau and Suffolk Counties. CD 2/12.

N. Y.—**The Colorado Fuel & Iron Corp.**, 575 Madison Ave., New York, N. Y., LB **$190,543**, est. $274,000, (4 bidders), fencing at various locations 29.69 mi. Northern State Parkway (N. Y. City Line-Sunken Meadow Spur) Wantagh State Parkway (Northern St. Parkway-Southern St. Parkway) NSP 60-1 WSP 60-1, Nassau and Suffolk Counties.

N. Y.—**Spartacus DeLia**, 30 Campion Rd., N. Hartford, N. Y., LB **$474,150.90**, est. $591,000, (8 bidders), b. conc. Type 1A, 4.13 mi., wid'n. rein.-con. slab br. span 20 ft., Utica-Poland Pt. 2B, SH 5691-a, Utica-Poland, Pt. 3, SH 5597, Rte. 8, FARC 60-21, Proj. S-482(1), Oneida Co.

N. Y.—**No Bids Received**—Est. **$45,000**, traffic signals Broadway-Hastings-Dobbs Ferry-Mt. Pleasant-Tarrytown-N Tarrytown, SH 9206; White Plains-Eastview Rd., SH 5571; Spring Valley-Knapps Corners, SH 689, Knapps Corners-Nyack SH 5178, T.C. 60-1, Rockland and Westchester Counties.

N. Y.—**The Whitman Nurseries, Inc.**, 236 Walt Whitman Rd., Huntington Sta., N. Y., LB **$139,706**, est. $209,000, (9 bidders), roadside development 6.8 mi. Sunrise Hy. Exten. SH No. FASH 58-5; FASH 58-6, Rte. 27, FARC 60-26, Proj. U-947(20); F-947(20), Suffolk Co. CD 2/18.

▲ **NEW YORK**—State Dpt. P. Wks., State Office Bldg., Albany, Bids opened 3/17,

N. Y.—**Philsen Co.**, 152 W. 42nd St., New York 36, N. Y., LB **$2,577,399**, est. $3,340,000, (17 bidders), bridge substructure 0.29 mi., misc. work 0.02 mi., Interstate Rte. Conn. 511 (Cont. 1A) Cross Bronx Expressway (Alexander Hamilton Br. Substructure) FICBE 60-2, Proj. I-95-1(38), Bronx and New York Counties.

N. Y.—**Servidone Const. Corp.**, 916 Congress St., Schenectady, N. Y., LB **$347,790**, est. $436,000, (9 bidders), prestressed concrete beam br. 6 spans, 470.1 ft., 0.09 mi., misc. work 0.07 mi. New York City, Bd. of Water Supply, Rte. 1, Cannonsville Reservoir Stilesville Bridge, BWS 60-1, Delaware Co.

N. Y.—**Fehlhaber Corp.**, 217 E. 49th St., New York 17, N. Y. and **Terry Contg., Inc.**, 11-11 34th Ave., Long Island City 6, N. Y., LB **$10,830,123**, est. $12,347,000, (10 bidders), rein.-con. slab roadway on viaduct 0.8 mi., misc. work 0.02 mi., sheet aspht. pavt. (streets) 0.82 mi. alter and strengthen elevated steel struct. 80 spans, 4,216 ft. Int. Rte. Conn. 512 Gowanus Expressway (20th to 36th Sts.) Int. Rte. 278, FIGE 60-2, Proj. L-278-1(47), Kings Co. CD 2/18.

† **U. S. Eng.**, 111 E. 16th St., New York 3, N. Y., cancelled bids to have been opened about Mar. 18, dredging in channel north of Shooters Island partly in Richmond Co., N. Y. and Hudson Co., N. J. at jct. of Kill Van Kull, Arthur Kill and Newark Bay, CIVENG-30-075-60-35, NEW YORK and NEW JERSEY. $300,000. CD 3/3.

Peckham Rd. Corp., 50 Haarlem Ave., White Plains, N. Y., CA **$522,055**, Glens Falls east west by-pass, County Rd. 70, LAKE GEORGE, N. Y. Bd. Supervs. Warren Co., Lake George, N. Y. Bids Feb. 2. CD 1/8.

NEW JERSEY—State Hy. Dpt., 1035 Parkway Ave., Trenton, Bids opened 3/16,

The Constr. Service Co., P.O. Box 311, Bound Brook, N. J., LB **$549,785**, (7 bidders), dualization of Rte. 28 (Westfield Ave.) for 3/10 mi. from Coolidge Ave. to Bridge St., incl. wid'n. Lehigh Valley Railroad bridge over highway, Roselle Park, Union Co. CD 2/29.

▲† **McCloskey & Co.**, 1620 W. Thompson St., Phila., Pa., CA **$1,333,690**, concrete deck on west and east approach spans and aluminum bridge railing in the parapet of west approach retaining walls, west and east approach spans, the bascule span and east abutment wing walls, Woodrow Wilson Memorial Bridge over Potomac River, Forest Heights, Md., MARYLAND and VIRGINIA. Bureau P. Rds., Dpt. Commerce, 1440 Columbia Pike, Arlington, Va. Bids Feb. 25. CD 2/29, under LB.

R. F. Tomblyn Constr. Co., 3110 Leesburg Pike, Falls Church, Va., LB **$492,572**, (10 bidders), Contr. 60-401-B, interceptor sewers and force main; LB **$124,835**, (9 bidders), Contr. 60-401-C, pumping station, Watts Branch, ROCKVILLE, MD. City, City Hall, Rockville, Md. Gilbert Assoc., 525 Lancaster Ave., Reading, Pa., engrs. Bids Mar. 14. CD 3/25/58.

BUILDINGS—LB & CA

Seabrook Estates Homes, c/o Lane Realty Co., 107-40 Queens Blvd., Forest Hills, N. Y., Owner Builds, **$400,000**, 20 HOUSES, East 98th St. between Avenue M & N, BROOKLYN, N. Y.

▲ **Cassiol Constr. Co., Inc.**, 6 Brinkman St., Buffalo, N. Y., LB **$1,201,095**, general contract JUNIOR HIGH SCHOOL 89, Appenheimer St., BUFFALO, N. Y. Bd. Educ., City Hall, Buffalo, N. Y. Bids Feb. 2, awarded Mar. 10. CD 12/31.

▲ **George A. Fuller Co.**, 597 Madison Ave., New York, N. Y., CA Est. **$25,000,000**, 37 story OFFICE, Madison Ave., E. 42nd and 43rd Sts., NEW YORK, N. Y. First National City Bank, 55 Wall St., New York, N. Y. Kahn & Jacobs, 2 Park Ave., New York, N. Y., archts.

▲ **H R H Constr. Co.**, 579 Fifth Ave., New York 17, N. Y., LB **$14,943,000**, 19 story HOSPITAL, East 33rd St. and First Ave., NEW YORK, N. Y. New York University-Bellevue Medical Center, 550 First Ave., New York 16, N. Y. Bids Mar. 15. CD 3/10.

Parkfield Homes, c/o Lane Realty Co., 107-40 Queens Blvd., Forest Hills, N. Y., Owner Builds, **$450,000**, 30 HOUSES, Georgia Ave. near Austin Blvd., OCEANSIDE, N. Y.

▲ **A. Barbaresi & Son, Inc.**, 10 Fiske Pl., Mount Vernon, N. Y., LB **$1,073,460**, (20 bidders), general contract Quarters for Medical Staff, incl. MEDICAL EDUCATION BLDG., Married Staff Quarters Bldg., Grassland Hospital, VALHALLA, N. Y. Dpt. P. Wks., Westchester Co., County Office Bldg., White Plains, N. Y. Bids Mar. 16. CD 2/23.

Sutton Park Homes, c/o Alwin Cassens Jr., archt., 145 So. Franklin Ave., Valley Stream, N. Y., Owner Builds, **$780,000**, (addnl. section), 26 HOUSES, Mill Rd. south of Sunrise Hy., WOODMERE, N. Y.

Silver Terrace Apartments, c/o Lawrence M. Rothman, archt., 147 E. 125th St., New York 35, N. Y., Owner Builds, **$750,000**, 90 family APARTMENT, 135 Yonkers Terrace, YONKERS, N. Y.

Fred & James Corsi, C.B.T. Constr. Co., 1330 Main Ave., Clifton, N. J., Owner Builds, **$650,000**, 22 HOUSES, Brighton Ave., BELLEVILLE, N. J.

▲ **Isaac Deganaaras Co.** 231 Greenwood Ave., Midland Park, N. J., CA **$1,038,900**, SUPPORT FACILITIES

(Continued on page 310)

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FOR VOLUME PRODUCTION OF QUALITY AGGREGATE

These dramatic views of sections of the important new Illinois Tollway system serve as an outstanding example of the vast contributions to the progress of mankind being made by the construction industry. In huge construction projects such as this, specification aggregate has assumed an increasingly important role. To meet the constantly growing demand for vast tonnages of quality aggregate used in concrete and bituminous highways, Symons Cone Crushers are today, more so than ever before, the first choice of leading producers throughout the world. Symons Cone Crushers are also used in sand preparation operations.

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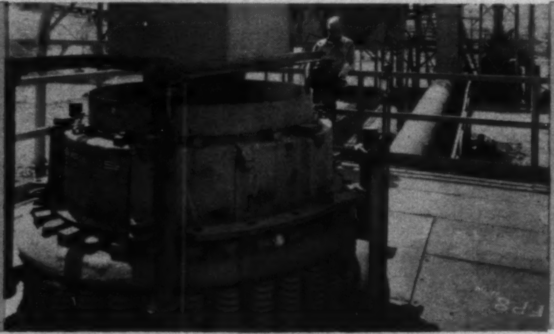

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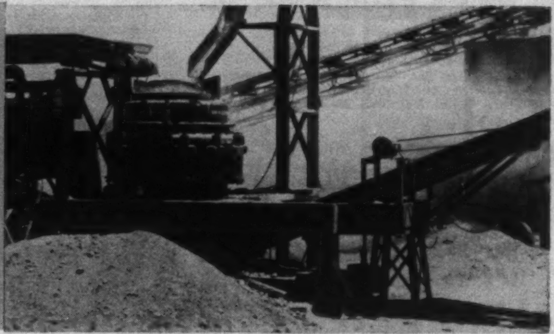
Symons Cone Crushers, in Standard and Short Head types, are the choice of leading contractors and producers for primary, secondary and finer reductions in all types of aggregate operations. Available in sizes from 22" to 7' in diameter, for capacities from 6 to 900 or more tons per hour.



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Symons Cone Crushers are being used in increasing numbers for portable and semi-portable crushing plants. View shows part of a Cedarapids portable crushing and screening plant, utilizing a Symons Cone Crusher. Unit is serving a large Texas aggregate producer.

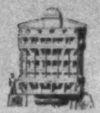
CIRCLE 308 ON READER SERVICE CARD

C-160

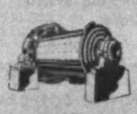
ILLINOIS
TOLLWAY

(ABOVE:) Tri-level interchange of Northwest and Tri-State Tollways near Chicago's O'Hare International Airport.

(RIGHT:) View of the modern Northwest Tollway bridge crossing the Fox River near Elgin, Illinois.

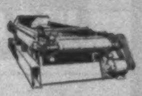


SYMONS PRIMARY GYRATORY CRUSHERS

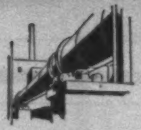


NORDBERG GRINDING MILLS

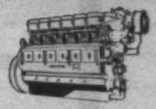
SYMONS VIBRATING GRIZZLIES



SYMONS VIBRATING SCREENS



ROTARY KILNS AND DRYERS



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SYMONS SCREENS NORDBERG

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(Continued from page 307)

at Picatinny Arsenal, ENG-30-075-60-70, DOVER, N. J., U. S. Eng., 111 E. 16 St., New York 3, N. Y., Bids Mar. 1. CD 3/4, under LB.

W. J. Happel & Co., 589 Central Ave., East Orange, N. J. Owner builds, Over **$500,000**, 12 HOUSES, Old Short Hills Rd., SHORT HILLS, N. J.

Spera Constr. Co., 1625 N. Front St., Harrisburg, Pa., CA **$517,313**, general construction, 26 room Melrose Elementary SCHOOL, 20 and Berryhill Sts., HARRISBURG, PA. Harrisburg School Bldg. Auth., 121 Chestnut St., Harrisburg, Pa. Bids Mar. 3, awarded Mar. 14. CD 2/9.

▲ **Kingswood Constr. Co.**, Box 249, 7253 Maple St., Annandale, Va., Owner Builds, **$18,000,000**, "Kingswood By The Severn" 600-acre site on Salt Works Creek, Severn River, incl. Kingswood Yacht and Country Club, golf course, homes, marina, motor hotel, club facilities and shopping center, ANNAPOLIS, MD. Donald J. Olivola, 7253 Maple St., Annandale, archt. Sherwood Engineering and James L. Hicks, Professional Bldg., Annapolis, Md., engrs. Derrick Kipp, 363 Bloomfield Ave., Montclair, N. J., assoc. archt. of clubhouse. Robert Trent Jones, 20 Vesey St., New York, N. Y., engrs. for golf course. C. A. Chaney & Assoc., 7240 Wisconsin Ave., Bethesda, Md., consult. engrs. for marina.

Courtleigh Homes, Inc., 711 St. Paul St., Baltimore 2, Md., Owner Builds, **$400,000**, 50 frame DWELLINGS Highmeadow Rd., Chartley Development, near BALTIMORE, MD.

Donald M. Jett Constr. Co., 111 E. Penna. Ave., Towson 4, Md., Owner Builds, **$459,000**, 27 brick, frame DWELLINGS Eastridge Springside and Hollow Brook Rds., near BALTIMORE, MD.

▲ **Frederick Constr. Co.**, Frederick, Md., CA **$1,033,000**, Cambridge Hall DORMITORY and DINING HALL, Maryland University, COLLEGE PARK, MD. State Dpt. P. Imprvts., 301 W. Preston St., Baltimore 1, Md. Bids Feb. 16. CD 2/18, under LB.

▲ **L. J. Keller & Son**, Jefferson, Md., LB **$1,963,000**, combined bid on Linganore JUNIOR-SENIOR HIGH SCHOOL and New Market ELEMENTARY SCHOOL addn.; LB **$1,512,000**, brick, steel, concrete, block, Linganore JUNIOR-SENIOR HIGH SCHOOL; LB **$456,000**, brick, steel, concrete block, New Market ELEMENTARY SCHOOL addn., FREDERICK, MD. Frederick Co. Bd. Educ., 115 E. Church St., Frederick, Md. Bids Mar. 11. Finney, Dodson, Smealie, Orrick & Assoc., 320 W. 24th St., Baltimore 11, Md., archt. for New Market School. CD 3/1.

▲ **J. Roland Dashrell & Sons**, Salisbury, Md., LB **$1,307,660**, CHURCH, FELLOWSHIP HALL EDUCATIONAL and RECREATION BLDG., SALISBURY, MD. Asbury Methodist Church, Salisbury, Md. Harold E. Wagoner, 117 S. 17th St., Phila., Pa., archt.-engr.

SOUTH

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 8 Kentucky
April 12 Virginia

STREETS AND ROADS

April 1 Kentucky & Indiana
April 8 Kentucky
April 12 Virginia

BUILDINGS—BA

N. C., Raleigh—HOSPITAL—BA 3/30—Rex Hospital, St. Marys St., hospital addn. $500,000. Extended date. Guy Crampton & Assocs., 115 W. Morgan St., archts. CD 3/9.

† **Ky., Paradise**—POWER PLANT CONDENSER—BA 4/5—Tennessee Valley Authority, New Sprankles Bldg., Knoxville, Tenn., condenser for 600,000 kilowatt generating unit steam power plant, Green River. $500,000. CD 10/6.

Tenn., Kingsport—CONVALESCENT HOME—BA 4/15—Holston Valley Community Hospital, convalescent home. $500,000. CD 2/19.

▲† **Va., Quantico**—HOUSING—BA 4/19—Area P. Wks., Chesapeake, U.S. Naval Weapons Plant, Wash., D. C., 450 unit Capehart Housing, Marine Corps Schools. Nathan C. Hale Assocs., 916 E. Broad St., Falls Church, archts. CD 9/30.

BUILDINGS—SLC

Va., Norfolk — EXCHANGE RETAIL STORE — National Bellas Hess, Inc., 111 8 Ave., New York, N. Y., soon lets contract 100,000 sq. ft. Government employee exchange retail store bldg., Virginia Beach Blvd. at Chinese Corner, with 1,000 car parking. $700,000. Harry R. Dudley, Jr., Colley and 45 St., Norfolk, and Manuel, Morris & R. E. Sixta, Railroad Exchange Bldg., Kansas City, Mo., archts.

HEAVY CONSTRUCTION—LB & CA

SOUTH CAROLINA—State Hy. Dpt., Columbia,
Cherokee, Inc., Sumter Highway, Columbia, S. C., CA **$939,841**, grading, drainage earthtype base course, stabilized aggregate base course, b. conc. surf. and concrete curb and gutter and concrete sidewalks 9.76 mi. U.S. Rte. 76 and 301 from Florence to Pee Dee River, S. C. Docket No. 21.444, Parts 1 and 2, F.A. Projects Nos. F-FG 2514 (5) and F-2514 (6), Florence Co. Bids Jan. 19. CD 1/25, under LB.

FLORIDA—State Hy. Dpt., Cherry Plaza Hotel, Auditorium, East Center Ave., Orlando,
Brinson-Allen Constr. Co., Box 2641, Tampa 1, Fla., CA **$823,066**, 4-lane 8½ in. limerock base, Type 1-B surf. tr. binder and Type 1-B conc. surf. course 3 in. thick, 4.227 mi. SR 25, Fed. Aid Projs. Job No. F 0192 (9) and F-009 3 (11), Jobs Nos. 09030-3203 and 16170 320 and State Job No. 09030-3501, Highland and Polk Counties. Bids Feb. 23, awarded Mar. 14. CD 3/23, under LB.

FLORIDA—State Rd. Dpt., Tallahassee,
Duval Engineering & Contr. Co., Box 1588, Jacksonville, Fla., CA **$579,884**, 8½ in. limerock base, 3½ in. surf., Type 1-b, surf. tr. binder course and Type 1 b. conc. surf. course, 10.125 mi. U.S. 15, U.S. 17, State Proj. Job No. 76030-3501, Putnam Co. Bids Jan. 26, awarded Mar. 14. CD 1/29, under LB.

▲ **FLORIDA**—State Rd. Dpt., Tallahassee,
Marion Constr. Co., Ocala, Fla., CA **$1,389,651**, 4-lane divided limerock base, Type 1 b. conc. surf. course and binder course 4.376 mi. SR 5, Fed. Air Proj. No. F 003-5 (7) Job No. 7020-3176, Brevard Co., Bids Dec. 15, awarded Mar. 14. CD 12/18, under LB.

Alabama Power Co., Alabama Power Bldg., Birmingham, Ala., Owner Forces, **$334,683**, 110,000 volt transmission line sub-station to serve Marathon Southern Corp., Naheola, ALABAMA.

BUILDINGS—LB & CA

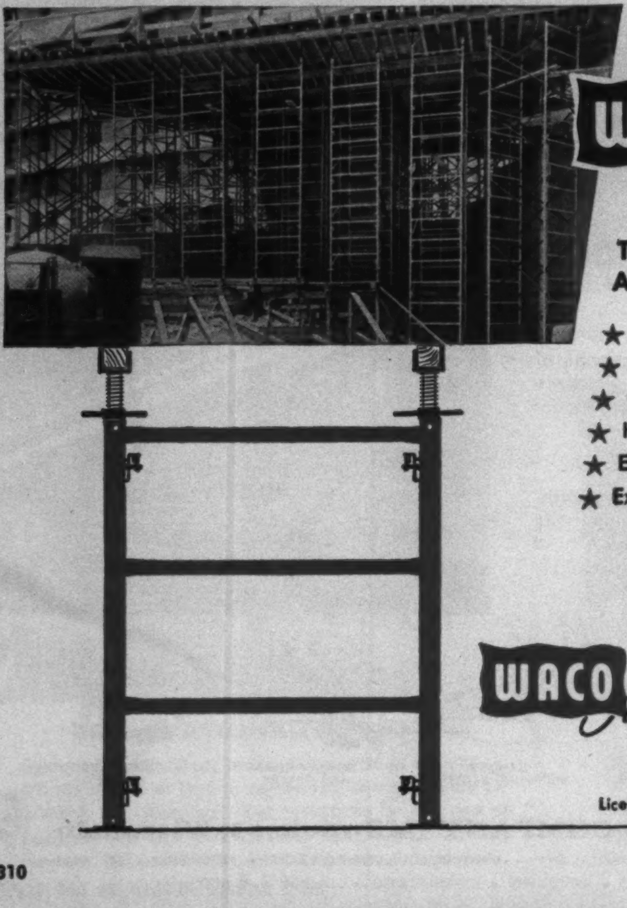
▲ **Robert R. Marquis, Inc.**, 2229 County St., Portsmouth, Va., CA **$1,384,927**, Azalea Gardens SCHOOL, NORFOLK, VA. Norfolk City School Bd., City Hall, Norfolk, Va. Bids Feb. 18, awarded Mar. 12. CD 2/23, under LB.

▲† **Paul Tishman Co., Inc.**, 21 East 70th St., New York, N. Y., LB **$2,914,987** (16 bidders), ACADEMIC BLDG., Armed Forces Staff College, Naval Base, NBy 24516, NORFOLK, VA. Dist. P. Wks. Office, 5th Naval Dist., U.S. Naval Station, Norfolk, Va. Bids Mar. 15. CD 2/18.

Southeastern Constr. Co., 301 W. 2 St., Charlotte, N. C., CA Over **$250,000**, PLANT addn., WAYNESBORO, VA. General Electric Co., Specialty Controls Div., Waynesboro, Va. CD 2/5.

Barge-Thompson Co., Inc., 136 Ellis St. N. E., Atlanta, Ga., CA **$400,000**, Toll OFFICE addn., CHARLESTON, S. C. Southern Bell Telephone & Telegraph Co., Owen Bldg., Columbia, S. C. Bids Mar. 22. CD 3/10.

Herm Geller Constr. Co., 14075 W. Dixie Highway N. Miami, Fla., CA **$400,000**, 35-unit APARTMENT, 7942 East Dr., NORTH BAY VILLAGE, FLA. Melvin Brustein, c/o B. R. Swartberg, archt., 4014 Chase Ave., Miami Beach, Fla. Bids Dec. 21. CD 12/15.



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MIDDLE WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

March 29, April 12 Ohio — March 31 Indiana
April 6 Michigan

STREETS AND ROADS

March 29, April 12 Ohio — March 31 Indiana
April 6 Michigan

Ill., Chicago—WATER AND FIRE PROTECTION—BA 4/5—Dpt. Purchases, City Hall, Zone 2, No. 80.85-60-115, water and fire protection system, Chicago O'Hare International Airport, Park Ridge, $450,000. Naess & Murphy, 224 S. Michigan Ave., Zone 4, engrs. CD 3/6/59.

BUILDINGS—BA

O., Waverley—SCHOOL—BA 4/8—Bd. Educ., Waverley North Elementary School, $470,000. Plans deposit $25. Howard & Thomas McClorey, 3002 Woodburn St., Cincinnati, archts. CD 11/11/58.

HEAVY CONSTRUCTION—LB & CA

▲ **OHIO**—Dpt. Hys., State Depts. Bldg., Columbus, O.,
O.—**Chapin & Chapin, Inc.**, Rte. 20 E, Norwalk, O., CA **$1,562,189**, Type T-71, structures 4.229 mi. Sections 21.39-22.50, F-617(8) State Rte. 7, Village of Clarington and Salem Twp., Monroe Co.;
O.—**Wander & Mason, Inc.**, 1028 Proprietors Rd., Worthington, O., CA **$637,479**, Type T-71, T-35, structure 1.061 mi. Sections (10.79-11.54) S-US 103(3), State Rte. 70, Staunton and Concord Twps., Miami Twp. CD 3/10, under LB.

Dandrea-Nardini Constr. Co., 21st St. and B. & O. RR. Loraine, O., LB **$872,245**, (2 bidders), Section C-1, Westerly interceptor sewerage system, AVON LAKE, O. Village, Village Hall, Avon Lake, O. Bids Feb. 18. CD 2/5,
D. A. Dyche Salvage Corp., 1324 Giel Ave., Cleveland 7, O., CA **$124,628**, (5 bidders), Section C-2 submerged outfall sewerage system (Avon Lake, O.)

▲ **Six Industries, Inc.**, 626 Railroad St., Springfield, O., LB **$1,898,721**, sewage disposal plant imprvs., SPRINGFIELD, O. City, City Hall, Springfield, O. CD 1/21.

ILLINOIS—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldgs., Springfield,
Arcole Midwest Corp., 3225 Main St., Evanston, Ill., CA **$566,000**, 6 grade separation roads over FAI 80, near Seneca, LaSalle and Grundy Counties. CD 2/24, under LB.

▲ **ILLINOIS**—Dpt. P. Wks. & Bldgs., Div. Hys., Centennial Bldg., Springfield,
Arcole Midwest Corp., 3225 Main St., Evanston, Ill., CA **$1,708,312**, paving 4 mi. FAI 80 from Minooka to US 66, Will, Grundy and Kendall Counties. Bids Feb. 19. CD 2/24, under LB

Ciccone Bros., Inc., 3835 W. Lake St., Chicago, Ill., CA **$807,900**, sanitary sewerage system, FOX LAKE, ILL. Village, Village Hall, Fox Lake, Ill. Bids Feb. 23, awarded Mar. 7. CD 3/3, under LB.

Mass Constr. Co. Algonquin, Ill., LB **$303,155**, two ramps for Centennial bridge approaches, ROCK ISLAND, ILL. Rock Island Centennial Bridge Comn., 201 15th St., Rock Island, Ill. Bids Feb. 11.

▲† **Roen Salvage Co.**, Sturgeon Bay, Wis., LB **$1,133,000**, dredging Manistique Harbor, CIVENG-20-064-60-40, MICHIGAN. U. S. Eng., 1101 Washington Blvd., Detroit, Mich. Bids Mar. 15. CD 3/10.

BUILDINGS—LB & CA

Kenneth R. Evenson, 32341 Electric Blvd., Avon Lake, O. Own Forces, **$700,000**, 25 HOMES, Yoder Blvd., AVON LAKE, O.

Drosd & Drost Constr. Co. 2119 S. Green Rd., Cleveland 21, O., Own Forces, **$485,000**, 25 HOMES, Heatherwood Rd., BROOK PARK, O. Louis J. Rotman, 31715 Vine St., Wickliffe, O., archt. CD 3/14.

▲ **The Austin Co.**, 16112 Euclid Ave., Cleveland, O. Own Forces, **$1,200,000**, 2 story OFFICE and RESEARCH, 1 story HEADQUARTERS, CLEVELAND, O.
Drosd & Drost Constr. Co., 2119 S. Green Rd., Cleveland 21, O., Own Forces, **$440,000**, 21 HOMES, E. Parkleigh Dr., Seven Hills Village, CLEVELAND, O. Louis J. Rotman, 31715 Vine St., Wickliffe, O., archt.
Sepper Corp., 21565 Lorain Rd., Cleveland 26, O. Owner Builds, **$325,000**, 1 story, 20,000 sq. ft. brick, block, steel frame WAREHOUSE and OFFICE, CLEVELAND, O. Forrest O. Rennison, Hippodrome Annex, Cleveland 15, O., archt. Minneapolis-Honeywell Corp., lessee.

▲ **Hupp & Roehner Constr. Co.**, Springfield Pike, Dayton, O., Owner Builds, **$9,000,000**, Rona Hills Estates, 900 HOMES, Fairfield-Yellow Springs Rd., ½ mi. east of FAIRBORN, O.

Drosd & Drost Constr. Co., 2119 S. Green Rd., Cleveland 21, O., Own Forces, **$536,000**, 21 HOMES, SOM Center Rd., GATES MILLS, O. Louis J. Rotman, 31715 Vine St., Wickliffe, O., archt.

▲ **Darin & Armstrong, Inc.**, 14th St., Detroit, Mich., CA Est. **$3,000,000**, (14 bidders), 335,000 sq. ft. WAREHOUSE and PARTS OFFICE, HUDSON, O. Euclid Div., General Motors Corp., Hudson, O. Awarded Mar. 1. CD 12/10.

Fred J. Hurley, 1038 Richmond Dr., Westlake, O. Own Forces, **$396,000**, 12 HOMES, Leona and Mercedes Drs., ROCKY RIVER, O.

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CIRCLE 311 ON READER SERVICE CARD

▲ **Modern Real Estate Sales,** 8015 Plainfield Rd., Cincinnati, O., Own Forces, **$1,386,000,** sixty-three 1 story, 2 story, bsmnt., brick HOUSES, off Thornview Dr., SHARONVILLE (BR. CINCINNATI). O. J. S. Wald & Assocs., N. Bend Rd., Cincinnati, O., engrs.

▲ **Paschen Contractors, Inc.,** 2733 Elston Ave., Chicago, Ill., LB **$9,118,000,** (6 bidders), Stage 1, William Green HOUSING, Proj. 2-30, CHICAGO, ILL. Chicago Housing Authority, 608 S. Dearborn St., Chicago 5, Ill. Bids Mar. 15. CD 2/9.

C. A. Tharnstrom & Co., 7401 S. St. Louis Ave., Skokie, Ill. CA **$683,395,** general contract 2 story LIBRARY and MUNICIPAL BLDG., Orrington Ave. and Church St., Bedford Station, EVANSTON, ILL. Dpt. P. Wks., City Hall, Evanston, Ill. Bids Feb. 25, awarded Mar. 9. CD 2/3.

▲ **Scandroli Constr. Co.,** 823 N. Madison St., Rockford, Ill. CA **$1,200,000,** CENTRAL CATHOLIC HIGH SCHOOL, Campus Hills Section, ROCKFORD, ILL. Roman Catholic Archdiocese, 1245 N. Court St., Rockford, Ill. Awarded Feb. 27.

Kay & Ess, Inc., 3811 Montrose Ave., Chicago, Ill., CA **$500,000,** CHURCH, SCHOOL, sewage plant Hickory Hills, WILLOW SPRINGS, ILL. Parish of St. Patricia, 9115 S. 87th Ave., Hickory Hills, Ill. The Higgins Assocs., 288 N. LaSalle St., Chicago 1, Ill., archts. Awarded Mar. 3.

Alfred A. Smith, Inc., 721 E. Saratoga St., Detroit, Mich., CA **$854,645,** JUNIOR HIGH SCHOOL, Campbell Rd., ROYAL OAK, MICH. Bd. Educ., 1026 N. Main St., Royal Oak, Mich. O'Dell, Hewlett & Luckenbach, 950 Hunter Blvd., Birmingham, Mich., archts. CD 3/21/55.

MISSISSIPPI TO ROCKIES

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES

April 1 Minnesota — **April 6 North Dakota**
April 7 South Dakota — **April 8 Kansas**

STREETS AND ROADS

April 1 Minnesota — **April 5, 8 Kansas**
April 6 North Dakota — **April 7 South Dakota**

† **Arkansas**—BA 4/12—U. S. Eng., Gay Bldg., Little Rock, pile dike revetment South Bank of Arkansas River, CIVENG-03-050-60-59. $300,000. Plans deposit $1. CD 3/16.

▲† **Iowa-Nebraska** — BA 4/14 — U. S. Eng., 1709 Jackson St., Omaha 2, Neb., repairing dikes and revetments, Missouri River, Sioux City to Omaha at Tysons-Upper Rockport Bends in vicinity of Blair, CIVENG-25-066-60-74, $600,000; constr. and repair dikes and revetments, Missouri River, Sioux City to Omaha at Upper Rockport-Council Bends, CIVENG-25-066-60-75, $500,000. CD 9/30.

† **Missouri**—BA On Or About 4/19—U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo., constr. and repair of dikes and revetment Miami to Glasgow Bends, River Mile 264.6 to 226.8, Missouri River, Glasgow, CIVENG-23-028-60-60. $300,000. CD 9/30, under Nebraska, Kansas and Missouri.

† **Missouri**—BA On Or About 4/19—U. S. Eng., 1800 Federal Office Bldg., Kansas City, Mo., constr. and repair of dikes and revetment, Bluffport Reach to Searcys Bend, River Mile 226.8 to 177.1, Missouri River, Boonville, CIVENG-23-028-60-61. $400,000. CD 9/30, under Nebraska, Kansas and Missouri.

† **Oklahoma**—BA About 4/20—U. S. Eng., Box 61, Tulsa, Zone 2, stone fill, excavation, stabilization, channel rectification along portion Arkansas River, Short Mountain, CIVENG-34-066-60-106. $400,000. CD 10/15/45.

Okla., Tulsa—HOTEL—Bids Asked—Tulsa Airport Authority, City Hall, (selected list of bidders), hotel at Municipal Airport. $600,000. CD 2/13.

BUILDINGS—BA

▲ **Minn., Roseville (P.O. St. Paul)**—SCHOOL—BA 3/29—Bd. Educ., Independent School Dist., New Brighton, Johanna Junior High School, S. County Rd. D, Cleveland and Fairview Aves. $1,500,000. Ellerbe & Co., 333 Sibley St., St. Paul, archts. CD 4/2/58.

Ark., Malvern—SCHOOL—BA 4/5—Malvern School Dist., Junior High School and elementary school. $610,000. Wittenberg, Delony & Davidson, 510 Center, Little Rock, archts. CD 2/1/28.

Tex., Wichita Falls—LABORATORY, etc.—BA 4/14—Texas Hy. Dpt., Austin, concrete, steel, masonry laboratory, storage equipment, service station, office, outside utilities. $200,000-$500,000. Plans deposit $50. Jas. R. Killebrew, 1710 Dayton St., archt. Zumwalt & Vinther, Mercantile Bldg., Dallas, engrs.

▲ **Minn., Northfield**—DORMITORIES—BA 5/2—St. Olaf College, two dormitories. $1,500,000. Thorshov & Cerny, Inc., 400 Metropolitan Bldg., Minneapolis, archt.

BUILDINGS—SLC

▲ **Tex., Garland**—MOTOR HOTEL—Kelman Enterprises, Ralph Kelman, 4153 Travis St., Dallas, soon lets contract 86 units Motor Hotel. $1,100,000. Wm. Linnstaedter & Bailey A. Swenson, 3106 Brazos St., Houston, and 4153 Travis St., Dallas, archts. Ed. L. Wilson, 207 Mercantile Commercial Bldg., Dallas, Tex., engr. CD 11/16.

Tex., San Antonio—CLUB—Canyon Creek Country Club, Rte. 10, Box 87, soon lets contract club, $400,000. O'Neil Ford & Associates, Brooks Martin & Associates, 528 King Wm. St., archts. CD 122/59.

HEAVY CONSTRUCTION—LB & CA

J. A. Tobin Constr. Co., 3701 Rainbow, Kansas City, Kan., LB **$421,106,** (8 bidders) rein.-con. pipe for culverts; LB **$422,781,** corr. metal pipe, grade and constr. entrance roadway and grade site for Terminal Bldg., Mid-Continent Airport, KANSAS CITY, MO. City, Dpt. P. Wks., Kansas City, Mo. Bids Mar. 4, CD 8/12/52.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 2/15,
Tex.—**Adams Bros.,** P. O. Box 310, Athens, Tex., LB **$646,530,** grading, structures, 6.625 mi. Hy. IH 20, Proj. I 20-6(4) 537, Smith Co.;
Tex.—**Bryant Hoffman,** Box 390, Plainview, Tex., LB **$544,422,** grading, structures, base, surf. 18.258 mi. Hy. U. S. 84, Proj. F 635 (8) Garza Co.;
Tex.—**Gulf Bitulithic Co.,** Box 2572, Houston, Tex., LB **$207,347,** grading, base, surf. 4.115 mi. Hy. F. M. 1960 Proj. C 1685-3-6, Harris Co.;
Tex.—**Cecil Ruby Co., Inc.,** Box 4098, Austin, Tex., LB **$188,350,** grading, structures, base, surf. 10.678 mi. Hy. F. M. 1582 Proj. S 2449 (1), Frio Co.;
Tex.—**Brown & Root,** Box 5021, Houston, Tex., LB **$2,352,151,** grading, storm sewer, cement stab. base, structures, surf. 1.477 mi. Hy. IH 45, Proj. I 45-1 (29) and I 45-1 (18), Harris Co.;
Tex.—**E. B. Darby & Co., Inc.,** Box 467, Pharr, Tex., LB **$1,811,884,** grading, structures, base, surf. 3.999 mi. Hy. U. S. 83 Proj. U 93 (15) Cameron Co.;
Tex.—**R. N. Adams Constr.,** Box 581, Kaufman, Tex., LB **$272,926,** grading, flex. base, surf. treatment, 2.986 mi. Hy. U. S. 69 Proj. F 153 (5), Hunt and Rains Counties;
Tex.—**Heldenfels Bros.,** Box 1917, Corpus Christi, Tex., LB **$274,271,** grading, structures, base, surf. 7.788 mi. Hy. F. M. 1300, Proj. S 2215 (3) Jackson and Wharton Counties;
Tex.—**Hugh McMillian, Inc.,** P. O. Box 1612, El Paso, Tex., LB **$110,341,** hot mix b. conc. 16.002 mi. Hys. U. S. 62 and 180, Proj. C 374-6-8, Hudspeth Co.;
Tex.—**Fred Hall & Sons,** Valley Mills, Tex., LB **$297,506,** reconstr., grading, structures, base, surf. 11.175 mi. Hy. F. M. 709 Proj. C 162-9-9, Navarro Co.;
Tex.—**Henry L. Stafford,** Box 1047, Lubbock, Tex., LB **$121,161,** grading, structures, base, surf. 11.56 mi. Hy. F. M. 2010 Proj. S 2426 (1) Yoakum Co.;
Tex.—**Uvalde Constr. Co.,** P.O. Box 10286, Dallas, Tex., LB **$179,619,** hot mix asphalt pavement 11.762 mi. Hy. U.S. 80, etc. Proj. C 8-8-39 etc., Dallas, etc., Counties. CD 2/18;

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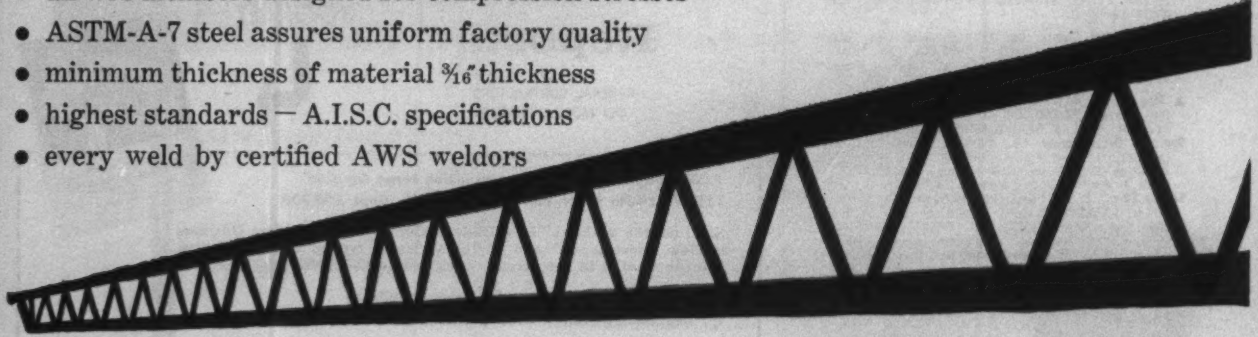

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Tex.—**J. H. Strain, Inc.**, Box 742, Haskell, Tex., LB **$198,983**, hot mix b. conc. 29.152 mi. Hy. U.S. 82 and 287, Proj. C 44-7-13, etc., Cooke and Clay Counties;

Tex.—**Flenniken Constr. Co., Inc.**, P.O. Box 6857, Dallas, Tex., LB **$1,607,613**, grading, concrete paving 1.201 mi. Hy. U.S. 75, Proj. U 539 (20) UG 539 (21), Grayson Co.;

Tex.—**Texas Bitulithic**, Box 10365, Dallas, Tex., LB **$1,445,459**, grading, concrete paving, storm sewer, and grade separation 2.914 mi. Hy. Loop 12, Proj. F. 1089 19) etc., Dallas Co.;

Tex.—**Brannan Contrs. Inc.**, 103 E. Mockingbird St., Victoria, Tex., LB **$144,182**, seal coat 104.397 mi. Hy. F.M. 992 etc., Proj. C 96-7-13, etc., Harrison, etc., Counties;

Tex.—**McElroy Transport Co.**, P.O. Box 7432, Fort Worth, Tex., LB **$262,240**, seal coat 184.384 mi. Hy. IH 20 etc., Proj. C 5-5-25 etc., Howard, etc., Counties;

Tex.—**Jones Bros. Dirt & Paving Contr.**, Box 3983, Odessa, Tex., LB **$259,526**, seal coat 216.3 mi. Hy. U.S. 80, etc., Proj. C-3-6-31 etc., Reeves etc. Counties;

Tex.—**Schwope, Inc.**, 6623 W. Commerce St., San Antonio, Tex., LB **$107,532**, widen, grading, structures base, surf. 14.719 mi. Hy. R.M. 1050 Proj. C 1160-1-4 Uvalde Co.;

Tex.—**Foley & Williams Contrs.**, 243 Owen Bldg., Tyler, Tex., LB **$368,898**, grading, structures, base, surf. 15.892 mi. Hy. F.M. 14, Proj. C 492-3-5, Wood Co. CD 2/25.

TEXAS—State Hy. Comn., Austin, Bids opened 3/15,

Tex.—**C. H. Harrison Co.**, P.O. Box 185, Waco, Tex., LB **$386,485**, widen Sabine River Bridge and approaches, 0.698 mi. Hy. ST. 149 Proj. F 650 (15) Gregg Co. CD 2/25.

Tex.—**Adams Bros.**, P.O. Box 310, Athens, Tex., LB **$346,881**, railroad grade separation and approaches, 1.442 mi. Hy. F.M. 1382 Proj. S 2094 (1) and SG 2094 (2) Dallas Co. CD 2/18.

COLORADO—State Hy. Dpt., 4201 East Arkansas, Denver, Bids opened 3/15,

C. L. Hubner Co., 4200 East Jewel, Denver, Colo., LB **$481,750**, (11 bidders), structures, grading, b. surf., Proj. No. F005-1 (14) Craig, Moffat Co. CD 3/7.

▲ **Peter Kiewit Sons**, P. O. Box 8787, University Park Station, Denver, Colo., CA **$1,298,264**, road Lowry Air Force Base, ENG-25-066-60-47, DENVER, COLO. U. S. Eng., 1709 Jackson St., Omaha 2, Neb. Bids Mar. 3. CD 3/8, under LB.

BUILDINGS—LB & CA

D. L. Witcher, Inc., 400 2nd Ave. S., Minneapolis, Minn., LB **$647,800**, (10 bidders), general contract GYMNASIUM-AUDITORIUM, MINNEAPOLIS, MINN. Augsburg College & Theological Seminary, 700 Block and 21st Ave. S., Minneapolis, Minn. Bids Mar. 1, CD 2/10.

H. H. Fox Constr. Co., 540 Railway Exchange Bldg., Kansas City, Mo., CA **$534,344**, (14 bidders), general contract. South SENIOR HIGH SCHOOL, RAYTOWN, MO. Raytown School Dist. No. 2, 83rd and Sterling Ave., Kansas City, Mo. Bids Mar. 2, awarded Mar. 7. CD 2/26.

Robert R. Wright, Inc., 111 W. Lockwood Ave., Webster Groves 19, Mo., CA **$495,537**, est. $400,000, 3 story, 35,000 sq. ft., brick, masonry blocks, rein.-con. 88-student DORMITORY, ST. CHARLES, MO. Lindenwood College for Women, 200 College St., St. Charles, Mo. Bids Feb. 25. CD 2/12.

Stocker Constr. Co., 3928 Lindell Blvd., St. Louis 8, Mo., CA Est. Over **$500,000**, 1 story, 65,000 sq. ft. WAREHOUSE and 20,000 sq. ft. air-conditioned OFFICE, Fairview Ave. in Page Industrial Center, ST. LOUIS COUNTY, MO. General Electric Lamp Division, 710 N. 12th Blvd., St. Louis 1, Mo. Bids Feb. 18. CD 2/5.

G. L. Tarlton Contg. Co., 5500 West Park Ave., St. Louis 10, Mo., LB **$406,093**, 2 story, 28,000 sq. ft. air-conditioned OFFICE, 4568 West Pine Blvd. ST. LOUIS, MO. Otis Elevator Co., 2301 Locust St., St. Louis 3, Mo. Bids Mar. 8. CD 2/24.

Duke & Barnas Constr. Co., 9650 Clayton Rd., Ladue 24, Mo., CA., Est. **$400,000**, 1 story, SUPERMARKET and STORES, 6617-21-25-53 Varnon Ave. UNIVERSITY CITY (ST. LOUIS 30 P.O.), MO. Diamond Investment Co., 9650 Clayton Rd., Ladue 24, Mo. Burton J. Lipman, 7247 Olive St. Rd., University City 30, Mo., archt.

Tulsa Rig, Reel & Mfg. Co., 1624 W. 21 St., Tulsa, Okla., LB **$663,000**, (14 bidders), general contract T-shaped, concrete block and brick 65-bed HOSPITAL, surgical and laboratory facilities, PARSONS, KAN. Labette Co., c/o County Comrs., Oswego, Kan. Hewitt & Royer, 607 Westport Rd., Kansas City, Mo., archts. CD 4/22, under Kan. Oswego,

† **Burl Johnson and Burl Johnson & Assocs.**, 2570 S. Harvard St., Tulsa, Okla., CA **$4,913,225**, 300 unit CAPEHART HOUSING, Clinton-Sherman Air Force Base, Inv. 34-611-60-12, CLINTON, OKLA. Base Procurement Office, Clinton-Sherman Air Force Base, Clinton, Okla. Bids Jan. 27. CD 2/17, under LB.

Hudgens Constr. Co., 620 S. Main St., McAlester, Okla., LB **$698,000**, DORMITORY and FACULTY HOUSING, Eastern Oklahoma A & M College, WILBURTON, OKLA. Bd. Regents, Capitol 5, Oklahoma City, Okla. Hudgins, Thompson & Ball, 1411 Classen St., Oklahoma City, Okla., archts. Bids Feb. 25. CD 2/18.

Hallmark Homes, 3689 Del Monte St., Houston, Tex., Owner Builds, **$424,400**, 36 DWELLINGS; **$427,218** 39 DWELLINGS, Craigmont Addn. expansion, BAYTOWN, TEX. CD 1/20.

Thad Dederick Constr. Co., Box 13067, Beaumont, Tex., CA **$626,900**, CHURCH, BEAUMONT, TEX. First Baptist Church, 848 Broadway, Beaumont, Tex. Ingram & Harris 1125 Freeway, North Beaumont, Tex., archts. B. J. Broadus, 1120 Longfellow Dr., and Michael Barr, 3410 Anderson St., Beaumont, Tex., engrs. CD 8/14.

North Bay Corp., 5555 Cranbrook Rd., Houston, Tex., Owner Builds, **$411,225**, 28 DWELLINGS; **$405,000**, 26 DWELLINGS, Kenwick Plaza Addn., CORPUS CHRISTI, TEX. CD 2/15.

E. O. Ross, Inc., 1903 N. Lexington Blvd., Corpus Christi, Tex., CA **$750,000.**, GRAIN STORAGE ELEVATOR, CORPUS CHRISTI, TEX. Gulf Terminal Grain Co., Walter Theis, pres., Port Terminal, Corpus Christi, Tex. CD 3/17.

T. C. Bateson Constr. Co., Box 35351, Dallas, Tex., LB **$758,800**, (7 bidders), REHABILITATION CENTER, 7850 Brook Hollow Rd., DALLAS, TEX. Dallas Rehabilitation Center, c/o Howard R. Meyer, archt., 2909 Fairmont St., Dallas, Tex. Bids Mar. 4. CD 3/1.

† **Robert E. McKee, General Contractor, Inc.**, P. O. Box 562, El Paso, Tex., CA **$810,900**, (over 3 bidders), 11 BARRACKS, 1 MESS HALL, Fort Bliss, Inv. No. ENG-29-005-60-60, EL PASO, TEX. U. S. Eng., Box 1538, Albuquerque, N. M. CD 3/15, under LB.

Charles V. Blanton, Contractor, 7327 Sandpiper St., Houston, Tex., Force Account, **$440,000**, 20 brick DWELLINGS, **$421,250**, 20 brick trim DWELLINGS, in Sharpstown, HOUSTON, TEX. CD 3/7.

King Constr. Co., 3818 Chaffin St., Houston, Tex., CA **$444,215**, 39 DWELLINGS, **$409,110**, 35 DWELLINGS, adjacent Freeway Forest Subdivision, HOUSTON, TEX. Bayou Homesites, Inc., 9546 Meadowbriar St., Houston, Tex. CD 1/13.

Lakewood Building Co., 4034 Grapevine Rd., Houston, Tex., Owner Builds, **$427,500**, 30 DWELLINGS; **$408,200**, 25 DWELLINGS, in Woodforest Subdivision, HOUSTON, TEX. CD 3/4.

Letch Building Corp., 7121 Neff St., Houston, Tex., Owner Builds, **$404,000**, 20 DWELLINGS, HOUSTON, TEX. CD 2/15.

Jas. E. McDaniels & Frank Thielen, Contractors, 9507 Braeburn Glen, Houston, Tex., Owners Build, **$424-115**, 34 DWELLINGS, HOUSTON, TEX. CD 3/9.

Manhattan Constr Co., 1811 Crawford St., and **P. G. Bell & Co., Inc.**, 500 Stanford St., Houston, Tex.,

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jointly, CA $615,000, excavation and rein.-con. FOUNDATION, for 28 story Office-Hotel, HOUSTON, Tex., Lincoln Liberty Life Insurance Co., 1508 Milam St., Houston, Tex. Sheraton Hotel Corp.-hotel lessees, CD 3/7.

H. P. Moore Contractor, 7050 Sharpcrest St., Houston, Tex., Owner Builds, **$429,450**, 20 DWELLINGS, in Sharpstown, HOUSTON, TEX. CD 3/7.

T. E. Webster, Contractor, 7127 Neff St., Houston, Tex., Owner Builds, **$414,000**, 27 DWELLINGS, HOUSTON, TEX. CD 3/8.

J. G. Wilkerson, Builders, 7031 Sharpcrest St., Houston, Tex., Owner Builds, **$431,875**, 24 DWELLINGS, in Sharpstown, HOUSTON, TEX. CD 3/7.

John J. Stokes Constr. Co., P. O. Box 691, San Marcos, Tex., LB **$642,246**, (4 bidders), COUNTY HOSPITAL annex and remodeling, LUFKIN, TEX. Angelina County, c/o Comrs. Court, Courthouse, Lufkin, Tex. Bids Mar. 10. CD 2/29.

C. W. Nugent, Union Oil Bldg., Midland, Tex., CA **$425,000**, main CLUB UNIT etc.; **$112,195**, club grounds pavement and large auto center pavement; **$90,000**, swimming pool-appurtenances near ODESSA, TEX. Thunderbird Club, Inc., Black Bldg., Coy Holcomb, pres., Odessa, Tex. Grand total $627,195. CD 7/28.

H. A. Lott, Inc., P. O. Box 25005, Houston, Tex., CA $776,776, HANKAMER SCHOOL OF BUSINESS, 1st unit, WACO, TEX., Baylor University, 1401 S. 5th St., Waco, Tex. CD 3/9, under LB.

FAR WEST

HEAVY CONSTRUCTION—BA

STATE HIGHWAY LETTINGS

BRIDGES
April 13 California

STREETS AND ROADS
April 13, 14, 21 California

▲† **California**—BA 4/14—U. S. Eng., 751 S. Figueroa St., Los Angeles, imprvt. Caballero Creek Channel, CIVENG-04-353-60-24. $1,250,000. CD 4/21/44.

▲† **Oregon**—BA 4/14—U. S. Eng., Pittock Block, Portland, Eastside road on south fork McKenzie River, 20 mi. southeast of Blue River, Cougar Reservoir, CIVENG-34-026-60-145. $1,500,000. Plans deposit $5. CD 9/28.

BUILDINGS—BA

Calif., Los Altos—SANCTUARY, etc.—BA 3/31—Congregation Beth Am, c/o Goodwin B. Steinberg, archt., 302 Main St., P.O. Box 877, precast concrete sanctuary, youth chapel and classrooms, Arastradero Rd. $600,000. CD 7/6.

Calif., Vallejo—STORE—BA 4/1—John Breuner Co., c/o Bond & Dougherty, archts., 2118 Sacramento St., 60,000 sq. ft., frame, block furniture store, Hy. 40 and Tennessee St. $400,000.

Utah, Salt Lake City—SCHOOL—BA 4/7—Salt Lake City Bd. Educ., 440 E. 1st St., remodel Bryant Junior High School. $750,000. CD 9/25.

▲ **Ore., Eugene**—SCIENCE—BA 4/12—State Bd. Higher Educ., Box 5175, science bldg. expansion, University of Oregon. Plans deposit $60. Lawrence, Tucker & Wallmann, Failing Bldg., Portland, archts. Cooper & Rose, Builders Exchange Bldg., Portland, engrs. CD 6/25.

▲ **Calif., Visalia**—COUNTY JAIL—BA 4/19—Tulare Co., County Courthouse, 4 story, 55,000 sq. ft. rein.-con. county jail. $1,750,000. Plans deposit $200. Stuhr & Hicks, 924 Truxton Ave., Bakersfield, archts. CD 1/27.

▲ **Ore., Pendleton**—HOSPITAL—BA 4/29—St. Anthony's Hospital, 4 story hospital addn. $1,800,000. Edmundson & Kochendoerfer, Henry Bldg., Portland, archts. R. Evans Kennedy, Henry Bldg., Portland, engr. CD 10/27.

BUILDINGS—SLC

Calif., San Diego—HOSPITAL—Hillside Hospital, 1940 E. Cajon Blvd., soon lets contract 1 story, 27,500 sq. ft. frame, stucco 50-bed hospital. $500,000. Faxon, Gruys & Saylor, 8440 Melrose Ave., Los Angeles, archts. CD 10/27/55.

▲ **Ore., Portland**—HOSPITAL—Physicians & Surgeons, 1927 NW Lovejoy St., soon lets contract 4 story hospital addn. Roald, Schmeer & Harrington, Portland Trust Bldg., archts. CD 12/12/58.

HEAVY CONSTRUCTION—LB & CA

▲† **Manson-Osberg Co.**, 1132 N. 128th St., Seattle 33, Wash., LB **$3,381,120** rearward communications facilities at Duncan Canal and Ketchikan, Inv. 60-29, ALASKA, U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash. Bids Mar. 15, CD 3/3.
Gaasland Co., Inc., 1155 Ellis, Bellingham Wash., LB **$1,105,391** rearward communications facilities at Smugglers Cove, Inv. 60-29, (Alaska).

▲† **S. S. Mullen, Inc.**, 220 River St., Seattle, Wash., CA **$3,008,147**, rearward communications facilities, incl. composite bldgs., radio relay bldgs., covered walkways, fdns., outside utilities, roads and towers at Lena and Hoonah Point, Inv. 60-28, ALASKA. U. S. Eng., 1519 S. Alaskan Way, Seattle 4, Wash. Bids Mar. 10, CD 3/14, under LB.

Yukon Constr. Co. & Connolly Elec. Co., 1845½ 5th Ave., Anchorage, Alaska, CA **$653,089**, 62 mi. 69 kv transmission line, Homer, ALASKA. Homer Electric Assn. Inc., Homer, Alaska. Bids Dec. 10. CD 12/17, under LB.

† **H. L. Grohne**, 2594 N. Water St., Decatur, Ill. CA **$774,176**, Part I, repair and imprv. Wherry Housing, Mountain Home Air Force Base, Inv. 60-30, MOUNTAIN HOME, IDAHO, Base Procurement Office, Mountain Home Air Force Base, Idaho. Bids Jan. 21, CD 1/27, under LB;
Whisenant Constr. Co., 1611 W. Colorado Ave., Colorado Springs, Colo., CA **$230,289** Part II, repair and imprv. Wherry Housing, (Mountain Home, Idaho).

Tiago Constr., 3399 S. 2nd W. Salt Lake City, Utah, LB **$939,754**, (5 bidders) water distr. sys., pump section, BOUNTIFUL, UTAH. Bountiful Water Subconservancy Dist., 45 N. Main, Bountiful, Utah. Templeton & Linke, 500 Dooly Bldg., Salt Lake City, Utah, engrs. Bids Feb. 24. CD 11/17/58.

Murphy Bros., Inc., E. 3728 Broadway, Spokane, Wash., CA **$608,462**, sewers in N. 128 and other streets, SEATTLE, WASH. City, County-City Bldg., Seattle, Wash. Bids Feb. 17, awarded Feb. 24. CD 2/24, under LB.

Northwest Constr. Co., 3950 6 Ave. N. W., Seattle, Wash., CA **$773,726**, est. $573,528, 62,380 sq. yd. concrete paving, 8470 sq. yd. concrete sidewalks, 4,225 ft. 8 and 12 in. sewers and 1,755 ft., 4 and 6 in. water mains in Raymond and other streets SEATTLE, WASH. City, County-City Bldg., Seattle 4, Wash. Bids Mar. 2, awarded Mar. 9. CD 3/8, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, Bids opened 3/16,
Guy F. Atkinson Co., 10 West Orange Ave., South San Francisco, Calif., LB **$4,109,789** (10 bidders), grading, paving 2.1 mi. eight lane MacArthur Freeway US 50 between San Pablo and Grand Ave. in Oakland, incl. fill for elevated freeway section, six crossing or interchange structures, nineteen retaining walls, IV-ALA-5-Oak, Alameda Co. CD 2/10.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento,
Baldwin Contg. Co., Inc. and J. W. Briggs, 9th and Yuba Sts., Marysville, Calif., CA **$1,188,123**, grading, surf. to reconstr. and realign 5.1 mi. US Hy. 299

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between 10 mi. east of Douglas City and Shasta County line to provide initial 2 lanes of future four lane expressway Trinity Co. Bids Mar. 2, awarded Mar. 14, CD 3/8.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles, Bids opened 3/10,

Griffith Co., 106 South Broadway, Los Angeles, Calif., LB **$8,737,889**, (9 bidders), constr. 1.1 mi. 8 lane freeway viaduct on Santa Monica Freeway, combination rein.-con. and structural steel (portions) between 8th St. and Hooper Ave., Los Angeles, VII-L.A.173-LAJV, Los Angeles Co. CD 1/28.

▲ **CALIFORNIA**—State Div. Hys., 120 S. Spring St., Los Angeles,

Silva & Hill Constr. Co. and Jack L. Adams Constr. Co., 1148 N. San Gabriel Blvd., South San Gabriel, Calif., CA **$3,768,522**, grading paving 8.5 mi. 4 lane freeway US Hy. 101 between El Sueno Rd. west of Santa Barbara and ½ mi. northwest of Elmwood Overhead, incl. 5 interchanges and 2 bridges, Santa Barbara Co. Bids Mar. 2 CD 3/7, under LB.

▲† **L. E. Dixon Co. & W. E. Kier Constr. Co.**, 409 S. California St., San Gabriel, Calif., LB **$7,694,000**, (5 bidders), Part Q-Labor and Security Bldg.; Part R navigation aids, radar air traffic control center and parachute bldg., Lemoore Naval Air Station, NBy 25179, LEMOORE, CALIF. Dist. P. Wks. Office, 12th Naval Dist., Rm. C-112, San Bruno, Calif. Urbahn, Brayton & Burrows and Milton T. Pflueger, 580 Market St., San Francisco, Calif., archts.-engrs. Bids Mar. 9 CD 2/11.

▲ **Macco Corp.** 14409 S. Paramount Blvd., Paramount, Calif., CA **$1,367,281**, Proj.. 497, Brown Canyon Storm Drain, LOS ANGELES, CALIF. Los Angeles County Flood Control Dist., 2250 Alcazar St., Los Angeles, Calif. Bids Feb. 26, awarded Mar. 8. CD 2/4.

BUILDINGS—LB & CA

Alder-Child Constr., 250 E. 39 S., Salt Lake City, Utah, CA **$748,800**, HIGH SCHOOL, Blanding, MONTICELLO, UTAH. San Juan School Dist., Monticello, Utah. Bids Mar. 7, CD 3/15, under LB.

▲ **Christiansen Bros. Inc.**, Box 1925, Salt Lake City, Utah, CA **$3,553,113**, SENIOR HIGH SCHOOL, SALT LAKE CITY, UTAH. Jordan School Dist., 9361 South State, Salt Lake City, Utah. Bids Feb. 24, CD 3/11, under LB.

H. George & Sons, Hutton Bldg., Spokane, Wash., CA **$459,000**, (5 bidders), 500,000 bu. concrete GRAIN ELEVATOR, DAYTON, WASH. Columbia Co. Grain Growers, Dayton, Wash. Bids Mar. 8. CD 2/25.

Contractors, Inc., 1101 NE 21st Ave., Portland, Ore., CA **$876,558**, STUDENT CENTER ADDN., Portland State College, PORTLAND, ORE. Bd. Higher Educ., Box 5175, Eugene, Ore. Bids Feb. 25, awarded Mar. 8. CD 3/2, under LB.

Gray & Pollack, 1110 S. Robertson Blvd., Los Angeles, Calif., Owner Builds, **$475,000**, 4 story stucco APARTMENT, 332 N. Palm Dr., BEVERLY HILLS, CALIF.

K. W. Koll Constr. Co., 1555 Placentia Ave., Newport Beach, Calif., CA **$824,200**, 50 frame, stucco DWELLINGS Ingram St., Prior St. Helmsdale Ave., Arvid St., Tract 24827, LA PUENTE, CALIF. P. C. Lumber Co., Inc., 1555 Placentia Ave., La Puente, Calif.

▲ **F. P. Lathrop Constr. Co., Inc.**, 800 University Ave., Berkeley, Calif., CA **$1,036,399**, 1 story, 46-bed Valley Memorial HOSPITAL, LIVERMORE, CALIF. Hospital Committee for Livermore-Pleasanton Area, c/o Stone, Malloy, Marraccini & Patterson, archts., 536 Mission St., San Francisco, Calif. Bids Jan. 12, CD 1/19, under LB.

Carter Co., 2975 Wilshire Blvd., Los Angeles, Calif., CA **$700,000**, 5 story rein.-con. OFFICE, 520 S. Virgil St., LOS ANGELES, CALIF. American Insurance Co., 111 W. 7th St., Los Angeles, Calif. Richard J. Hunter, archt., and Paul N. Greenfield, engr., both of 8417 Beverly Blvd., Los Angeles, Calif.

▲ **Tom E. Norcross**, 6053 Atlantic Ave., Long Beach, Calif., CA **$3,332,778**, Palos Verdes HIGH SCHOOL, 37 acre ocean-view site, Montemalaga Dr. and Dalton Rd., LOS ANGELES, CALIF. Bd. Educ., 1426 E. San Pedro St., Los Angeles, Calif. Bids Feb. 26, CD 3/2, under LB.

Ruane Corp., 4934 N. Walnut Grove Ave., San Gabriel, Calif., LB **$641,470**, (6 bidders), 20,000 sq. ft. brick, masonry OFFICE addn. and FOODS DEPARTMENT, LOS ANGELES, CALIF. Lowry's Foods, Inc., 568 San Fernando Rd., Los Angeles, Calif. A. G. Lavagnino, 505 Sierra Vista Ave., Pasadena, Calif., archt. Bids Mar. 9.

▲ **J. G. Watts Constr. Co.**, 672 South Lafayette Park Pl., Los Angeles, Calif., LB **$4,431,435**, (6 bidders), Pacific HIGH SCHOOL, Pacific Palisades, LOS ANGELES, CALIF. Bd. Educ., 1425 S. San Pedro St., Los Angeles, Calif. Bids Mar. 11. CD 2/9.

Mattson & Peterson, Inc., 721 E. 19th St., Oakland, Calif., Owner Builds, **$556,000**, 3 story, 48-unit wood frame APARTMENT, incl. swimming pool, recreation terrace, 12th Ave. and E. 17th St., OAKLAND, CALIF. Cecil Moyer, 399-15th St., Oakland, Calif., archt.

Grow Corp., 9700 W. Pico Blvd., Los Angeles, 35, Calif., Owner Builds, **$693,000**, 67 stucco DWELLINGS, Tract 24150, SAN FERNANDO, CALIF. Jenning Eng. Corp., 9219 W. Pico Blvd., Los Angeles, Calif., engrs.

▲ **Nomellini Constr. Co.**, Stockton, Calif. and **Fruin-Colnon Contg Co.** Burlingame, Calif., CA **$4,689,000**, 354 unit Alice Griffith GARDEN HOMES, area of Candlestick Stadium, SAN FRANCISCO, CALIF. San Francisco Housing Auth., 440 Turk St., San Francisco, Calif. Bids Mar. 10. **(Correction—status).** CD 3/15, under LB.

▲ **Oltmans Constr. Co., Inc.**, 516 Monterey Pass Rd., Monterey Park, Calif., CA **$2,600,000**, 90,000 sq. ft. steel frame, masonry BLDG. "G" Del Amo SHOPPING CENTER, TORRANCE, CALIF. Del Amo Estate Co., Del Amo Lease, c/o Welton Becket & Assoc., archts., 5657 Wilshire Blvd., Los Angeles, Calif. CD 2/5.

Earl Wilson Constr. Co., Box 788, Beverly Hills, Calif., CA **$430,000**, two 2 story, 50 unit, 109 x 183 ft. stucco APARTMENTS, 7343 & 7357, Sepulveda Blvd., VAN NUYS, CALIF. Thormally & Bird, Box 788, Beverly Hills, Calif.

▲ **Greenwood Co.**, 8660 Wilshire Blvd., Beverly Hills, Calif., Owner Builds, **$2,312,000**, 105 stucco DWELLINGS, Tract 22059, WOODLAND HILLS, CALIF.

CANADA

HEAVY CONSTRUCTION—LB & CA

STATE HIGHWAY LETTINGS

STREETS AND ROADS

April 5 Yukon Territory

BUILDINGS—BA

Man., Austin—SCHOOL—BA 3/29—Pine Creek School Dist. No. 30, c/o Libling, Michener & Assocs., archts., 138 Portage Ave. E., Winnipeg, school, $400,000.

▲ **Que., Ste. Rosalie**—SHOPPING CENTRE—BA 3/29—St. Hyacinthe Shopping Centre, 460 rue de l'Hotel Dieu, 70,000 sq. ft. shopping centre, Blvd. Sir Wilfrid Laurier, $1,000,000. Maurice Desnoyers, 1705 Girouard St., archt. Bourgeois & Martineau, 3365 Ridgewood Ave., Montreal, engrs. CD 1/18.

Alta., Edmonton—HOSPITAL—BA 3/30—Good Samaritan Hospital, 9666 70th Ave. (selected list of bidders), 2 story, rein.-con., brick hospital addn. $500,000. Aberdeen & Groves, 8411 109th St., archt. CD 4/2/59.

Que., Port Cartier—ADMINISTRATION—Bids Asked—Quebec Carter Mining Co., 1255 Laird Blvd., Mount Royal, administration. $800,000. Maurice Bouchard & Jacques De Blois, 376 rue du Roi, Quebec City, archt. CD 3/20/59.

BUILDINGS—SLC

Ont., Toronto—PARKING GARAGE—The Robert Simpson Co. Ltd., 176 Yonge St., soon lets contract 8 level ramp-type parking garage, Richmond St. W. Over $500,000. CD 3/10.

HEAVY CONSTRUCTION—LB & CA

▲ **BRITISH COLUMBIA**—Government of British Columbia, Parliament Bldgs., Victoria,

John Laing & Son (Canada) Ltd., 640 W. Hasting St., Vancouver, B. C., CA **$2,098,389**, constr. 3.22 mi. Trans-Canada Hy., Burnaby. Bids Feb. 5, awarded Mar. 10. CD 2/19, under LB.

▲ **BRITISH COLUMBIA**—B. C. Govt., Parliament Bldgs., Victoria,

Dominion Bridge Co. Ltd., 2450 Boundary Rd., Burnaby, B. C., CA **$6,894,287**, fabricating, erecting structural steelwork for main superstructure, Port Mann Fraser River bridge, Port Mann. Bids Feb. 17, awarded Mar. 10. CD 2/25, under LB.

B. C.—**John Laing & Son (Canada) Ltd.**, 640 W. Hastings St., Vancouver, B. C., CA **$3,760,668**, Phase 2, foundations and substructure for Fraser River Bridge, Port Mann. Bids Jan. 7, awarded Mar. 10. CD 1/27, under LB.

BRITISH COLUMBIA—B. C. Govt., Parliament Bldgs., Victoria,

Western Bridge & Steel Fabricators Ltd., 145 W. 1st St., Vancouver, B. C., LB **$730,873**, fabricating, erecting steel superstructure, Chilcotin River bridge, Cariboo Dist.

Canadian Dredge & Dock Co. Ltd., 60 Harbour St., Toronto, Ont., CA **$614,856**, substructure, bridge over north branch Sydenham River, new bridge fdns. and approaches, Wallaceburg, CHATHAM, ONT. Kent Co. County Municipal Bldg., Chatham, Ont. Laughlin, Wyllie & Ufnal, 53 Kipling Ave. S., Toronto 18, Ont., engrs. CD 3/17/58.

E. A. Henry Constr. Ltd., No. 7 Hy. E., Langstaff, Ont., CA **$596,951**, dewatering bldgs. and related structures, Humber Sewage Treatment Plant, TORONTO, ONT. Municipality of Metropolitan Toronto, 67 Adelaide St. E., Toronto, Ont. Bids Feb. 16, awarded Mar. 11. CD 2/26, under LB.

Foundation Co. of Quebec Ltd., 1900 Sherbrooke St. W., Montreal, Que., CA **$566,196**, operating plant for aircraft refuelling system, Montreal Airport, Dorval, MONTREAL, QUE. Dpt. Transport, Hunter Bldg., Ottawa, Ont. Bids Feb. 25, awarded Mar. 14. CD 3/1, under LB.

J. Bastien & Fils, Inc., 182 rue Briere, St. Jerome, Que., CA **$554,130**, filtration plant and underground reservoir, Contract A, ST. JEROME, QUE. Ville de St. Jerome, Village Hall, St. Jerome, Que. Bids Feb. 29, awarded Mar. 7. CD 3/7, under LB.

BUILDINGS—LB & CA

Bird Constr. Co. Ltd., 1427 19th Ave. S.E., Calgary, Alta., CA **$507,617**, 2 story, 102 x 162 ft., brick, granite FEDERAL bldg., MEDICINE HAT, ALTA. Dpt. P. Wks., 404 Hunter Bldg., Ottawa, Ont. Bids Feb. 17, awarded Mar. 10. CD 2/25, under LB.

Winnipeg Constr. Co., c/o Waisman & Ross, archts., 208 Edmonton St., Winnipeg, Man., LB **$564,550** (7 bidders), 3 story, rein.-con. crop RESEARCH CENTRE, FORT GARRY, MAN. University of Manitoba, 208 Administration Bldg., Fort Garry, Man.

▲ **P. G. Engineering Ltd.**, P.O. Box 21, Stockton-on-Tees, England and Power-Gas Canada Ltd., 4795 St. Catherine St. W., Montreal, Que., CA Total est. **$17,000,000**, design and construct HYDROGEN PLANT, MAITLAND, ONT. Brockville Chemicals Ltd. of Canada, c/o Sogemines Ltd., 1980 Sherbrooke St. W., Montreal, Que. CD 12/30.

R. W. McKay Constr. Co. Ltd., 400 N. Front St., Sarnia, Ont. CA Est. **$500,000** (7 bidders), 2 story, 100x125 ft. mezzanine and part. bsmnt., structural steel LIBRARY, air-conditioning, SARNIA, ONT. Sarnia Library Bd., Sarnia, Ont. Gibson & Pokorny, 305 Davenport Rd., Toronto, Ont., archts. Forbes & Rutherford, 270 Christine St. N., Sarnia, superv. archts. Ralph Manning & Assocs., 752A Yonge St., Toronto, Ont., engrs.

▲ **Toronto Industrial Leaseholds (1957) Ltd.**, 12 Sheppard Ave., Toronto, Ont., Owner Builds, **$5,000,000**, mall-type SHOPPING CENTER, WATERLOO, ONT. John W. Combs Ltd., 51 Eglinton Ave. E., Toronto, Ont., engrs. CD 12/1/58, under Public Buildings, City of Waterloo, as owner.

Morris Investments Ltd., 15 Eugenie St., Windsor, Ont., Owner Builds, **$600,000**, 4 story, steel, pre-cast concrete OFFICE, air conditioning, WINDSOR, ONT. Giffels & Vallet of Canada Ltd., 65 Elliott St. E., Windsor, Ont., engrs.

Foundation Co. of Quebec Ltd., 1900 Sherbrooke St. W., Montreal, Que., CA Est. **$900,000**, 1 story, 15,000 sq. ft. PLANT, Gatineau Milles, GATINEAU, QUE. International Fibre Board Ltd., Gatineau, Que. Durnford, Bolton, Chadwick & Ellwood, 4101 Sherbrooke St. W., Montreal, Que., archts. CD 1/11/45.

▲ **Les Enterprises Edmo**, 2190 Gouin Blvd. E., Montreal, Que., Owner Builds, **$1,000,000**, 4 story, rein.-con., brick OLD PEOPLES HOMES, Henri Bourassa E. Blvd., MONTREAL, QUE. Gilbert Moreau, 210 Cremazie Blvd. W., Montreal, Que., archt. Bourgeois & Martineau, 3365 Ridgewood Ave., Montreal, Que., engrs.

Construction Lebeau Engineer, 188 Briere St., St. Jerome, Que., LB **$752,816** (7 bidders), SECONDARY SCHOOL, Marie-Victoria St., ST. JEROME, QUE. Commission Scolaire Catholique de St. Jerome, St. Jerome, Que. Bids Mar. 10. CD 3/3.

▲ **Rembrandt Realty Co.**, 1410 Stanley St., Montreal, Que., Owner Builds, **$1,900,000**, 12 story 150x56x140 ft. concrete, brick, stone APARTMENT BLOCK. Sherbrooke St. W., MONTREAL, QUE.

▲ **Principal Investments Ltd.**, 133 Richmond St. W., Toronto, Ont., Owner Builds, **$3,000,000**, SHOPPING CENTER, Ile St. Joseph, THREE RIVERS, QUE. CD 2/24/59.

PUERTO RICO

HEAVY CONSTRUCTION—BA

▲ **INDIA**—BA 4/25—Chief Engineer, Kerala State Electricity Bd., P.B.65, Trivandrum 1, India, manufacture, supply and erection turbines, alternators, switchgear, transformers and other ancillary equipment for Sholayar Hydro Electric Station, Tender No. T2(F) 2/59. Plans on payment of Rs. 102.00 (21.45) per set.

BUILDINGS—BA

▲ **India**—POWER STATION—BA 5/2—Govt. of West Bengal, New Secretariat Bldgs., 1, Hastings St., Calcutta-1, power station equipment for Durgapur Thermal Power Station (extension), Spec. No. DTPS-5. Extended date. CD 3/2.

▲ **Australia**—COAL HANDLING PLANT—BA 5/23—Electricity Comn. of New South Wales, Box 5257, GPO, Sidney, N.S.W., coal handling plant, Vales Point Power Station on shores of Lake Macquarie about 50 mi. north of Sidney. $1,250,000. Plans deposit $22.50.

AMERICANS ABROAD

HEAVY CONSTRUCTION—BA

▲† **AFGHANISTAN**—BA 4/29—International Cooperation Administration, 815 Connecticut Ave. N.W., Wash. 25, D. C., U.S.A., for Royal Govt. of Afghanistan, Kabul,

bit. road mix, conditioning and surf. 70 mi. road between Kandahl and Wish, one major bridge over Tarnak River and conditioning and surf. 6 mi. of streets in city of Kandahl. $2,000,000. Ken R. White, 1567 Marion, Denver, Colo., U.S.A., engr. CD 8/12.

BUILDINGS—LB & CA

▲ **International General Electric Co.**, 150 E. 42nd St., New York, N. Y., U. S. A., CA 62,500 kw generator at Cristobal Colon Power Station, near HUELVA, SPAIN. Compania Sevillana de Electricidad, Seville, Spain. Total cost **$9,400,000**;

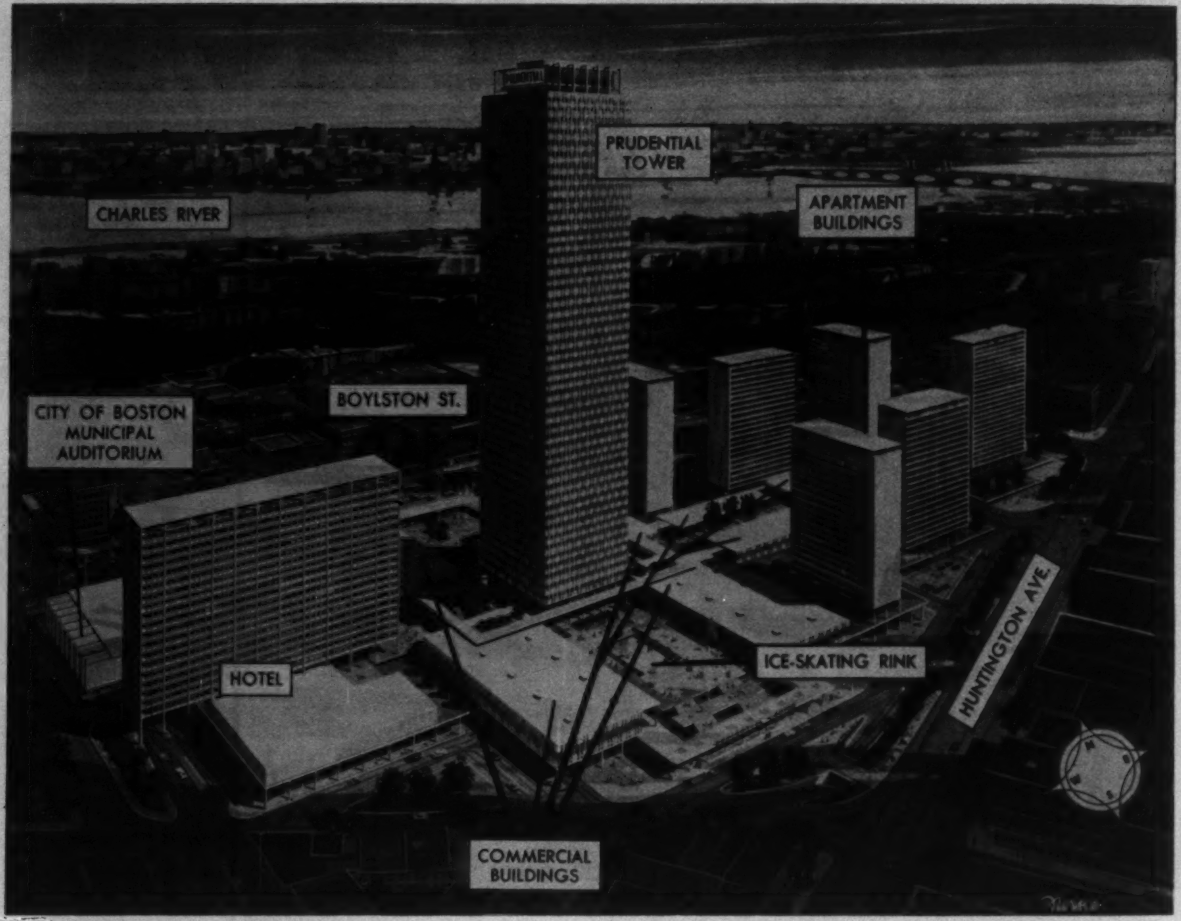
Babcock & Wilcox Co., 161 E. 42nd St., New York, N. Y., U. S. A., CA boilers and related machinery for Power Station (Huelva, Spain).

▲ **Westinghouse Electric International Co.**, 40 Wall St., New York, N. Y., U. S. A., CA, 62,500 kw. steam powered GENERATING UNIT for Power Plant, MIERES, SPAIN. Termicas Asturianas, Mieres, Spain, Total cost **$8,500,000**;

Combustion Engineering Co., 105 Adams St., Chicago, Ill., U. S. A., CA boilers for Power Plant (Mieres, Spain).

(Proposal Advertisements see pp. 333 to 335)

Business and Finance



Sponsors of Boston's Prudential Center are jittery because . . .

Tax Relief May Be Challenged

A $100-million, privately financed building complex now under way in Boston's Back Bay section is giving temporary jitters to city officials and the project's owners. Only special state legislation will bring permanent peace of mind and security of pocketbook to those involved.

The project is Prudential Center owned by the Prudential Insurance Company of America, Newark, N. J.

The cause for jitters is the compromise on city real estate taxes informally agreed to in 1958 by former Mayor John B. Hynes, other city officials and top community leaders. The tax agreement was the bait that brought the project to the city. All agreed on a real estate tax break for Prudential that would last 17 years.

Mayor John F. Collins, the current mayor, agrees that the tax compromise was sound in 1958 and just as sound today. But a top official of the insurance company says:

"If Mayor Collins were to be mayor for 17 years we would have no worry. But in the foreseeable future he will be mayor for four years. By that time we will have a huge structure up there at Huntington Avenue and Boylston Street. We simply cannot risk having someone else say . . . that an entirely different tax structure is going to be imposed. This agreement has got to be tied down."

Only state legislation will tie it down, so now it's up to Gov. Foster Furcolo and the state legislature. Governor Furcolo is awaiting some technical information he needs to draft a message and a bill for submission to an apparently cooperative legislature.

Many states, particularly those in the Southeast, have established tax structures favoring industrial construction. And tax concessions to private individuals and corporations are more and more being recognized by the nation's cities (see facing page) as a means—perhaps the only means—of stimulating new commercial construction and apartments.

But where introduced, the concessions are often widely misunderstood by property owners. A small, loud minority can stop the concessions, and that is the specter haunting the Prudential Center and its owner.

Under the Boston agreement, Prudential will pay a flat $450,000 in the first year, and in the next six years the tax will rise gradually to a maximum of about $2.7 million in the seventh year. Then from the eighth year through the seventeenth and final year of the agreement, the tax will be about $3 million or 20% of gross income, whichever is higher.

If there had been no compromise, and assuming that the $100-million project had been assessed at 100% of value as is generally the rule in Boston, the tax payment would be $10 million a year.

What appears to be a "tax break" is actually recognition of the keystone of the nation's economy—profit motive. The agreement concedes that taxes cannot be levied solely on the cost of land, steel, concrete and labor. They are to be based on what a building will net the owner after payment of debt service, maintenance, operation and taxes.

When negotiations started with the city in 1957, no opposition to a tax compromise was heard. Progress was smooth. Prudential bought a 33-acre site for more than $5 million and last year a $6-million contract for excavation and foundation work was awarded to George A. Fuller Co., New York City (ENR Apr. 16, 1959, p. 26).

Then last month a small group of property owners threatened to challenge the tax agreement in court on grounds it is "unconstitutional and illegal."

This announcement drew an emphatic reaffirmation of support from the local real estate board and other civic, business and professional organizations.

But the challenge is not just a bluff, so there is concern at Prudential. "We're going to need legislation," says a vice president of the company.

He reassured city officials that the company has made no decision to "pull out" of the project, but he warned that the possibility of the tax agreement being upset in the future "is an extremely real danger."

Legislative possibilities now being studied would eliminate, or at least minimize, the chances of a legal overthrow of the agreement.

. . . It's a Tricky Redevelopment Tool

"Allowing special tax rates or low assessments on new buildings is not yet widespread among municipal governments. But it might become so if the thinking used by Boston for the new Prudential Center does not become entangled in legal battles."

That's the way Albert W. Noonan, executive director of the National Association of Assessing Officers, Chicago, sums up the potential of one of the direct means that cities can adopt to boost private construction volume.

At least 25 states have legislation permitting some form of local public assistance to encourage private construction of commercial, residential and industrial structures. But the laws and their limitations are diverse and intricate. The meanings of the statutes are subject to numerous interpretations and are therefore cloudy as to what a city can do to stimulate construction.

In many states, the laws have not been used because they are considered defective, or there have been no proposals from private developers, according to Mr. Noonan. As many meanings can be drawn from laws as there are people to study them.

In Chicago, for example, city officials disagree on what the state law allows, so they have decided that a concession similar to the Boston-Prudential agreement is not possible. "We know of no case here where tax abatement or assessment freezes have been provided," says a spokesman in the office of Chicago's corporation counsel.

Wisconsin law permits municipalities to enact ordinances providing special assessment rates. First use of the state law, now about 16 years old, has just been made in Milwaukee. In that city, a private development corporation has bought and razed almost all of a two-block area. It plans to construct a 28-story office building, a bank building, and a six-level parking garage. The corporation's investment would be about $18 million. A construction starting date has not been decided on, but a spokesman for Wisconsin-Clybourn Urban Development Corp., the developing company, says "we hope to get started this year."

Wisconsin's law requires that:

- The proposed construction must be financed privately.
- It must be located in substandard areas.
- The project must cover a single area of at least 100,000 sq ft.
- The building management must be adjudged capable and competent.
- The developer must limit himself to a 6% return on investment during the period of the assessment freeze.

The Wisconsin-Clybourn proposal met those requirements, so the city agreed to freeze the assessment to produce tax revenue the same as that derived from the existing land and old buildings—$1.5 million.

New York State limits its tax concession to privately financed middle-income cooperative housing. To qualify, the development organization must be a limited profit corporation. New York City so far is the only city where the law is extensively used. The city also abates taxes on middle-income cooperative housing constructed on sites being redeveloped under Title I of the National Housing Act. In such cases, the tax levy is cut by about 40 to 45% from the normal charge.

Tax relief is also provided on existing residential units for specified and legally required improvements, such as central heating and hot water systems. These improvements to multiple-unit dwellings are exempt from real estate taxes for 12 years.

Tax concessions are not new in New York City. The idea was used as far back as 1920, only it was not merely tax abatement on a portion of the full tax bill; it was tax exemption. Moreover, the exemption was not provided only to limited-profit or non-profit organizations. It was given to all who started or completed new residential structures between 1920 and 1922. The exemption extended until 1932.

The law drew strong criticism and was eventually eliminated because the exemptions did not produce the low-income and middle-income housing that had been expected to result.

The idea of tax exemption for housing at least, is not yet dead. It was revived recently in a special housing study made for the city by J. Anthony Panuch, an attorney who specializes in corporate and governmetal reorganization (ENR Mar. 17, p. 25).

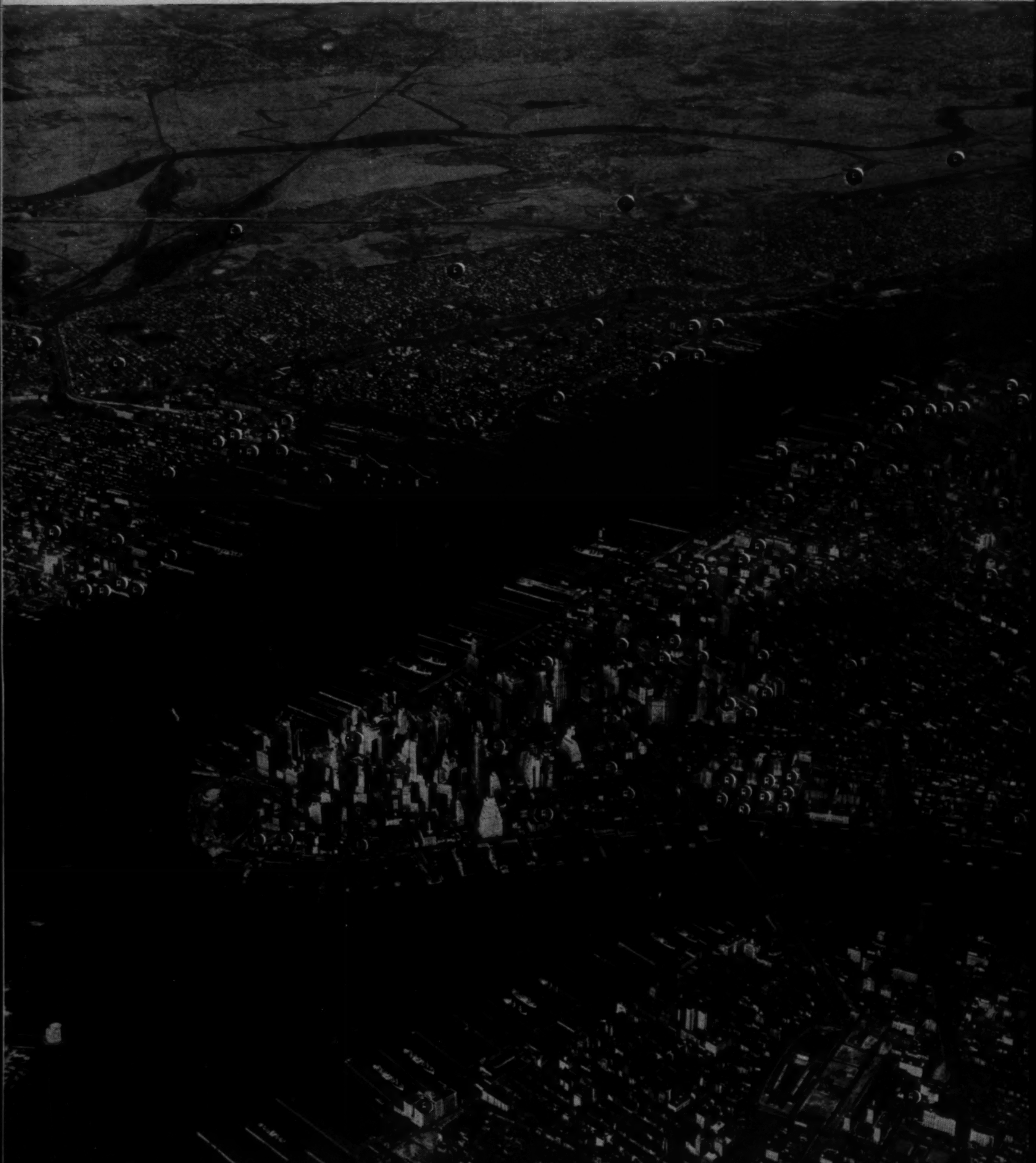
Kansas City, Mo., uses tax abatement as a redevelopment incentive, but here, too, the relief is provided to limited-profit organizations. During the first 10 years after rebuilding, taxes are based upon the assessed valuation of the site prior to improvements. During the next 15 years, the tax rate is based on 50% of the market value of the improvements. At the end of the 25-year period, taxes go to the normal rate.

Newark, N. J. also considers the potential earnings of a structure when it establishes taxes on new buildings.

Says the executive officer of a privately financed government study group: "A long, hard look at our city tax philosophies and practices is long over due. Then they will have to act. If the cities want to improve and grow, the investment builder must be given an incentive. It's the only way to speed and expand the market for new private construction."

East Side . . . West Side . . .

The dots indicate structures built on Raymond Foundations



All around New York . . .

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As you can see, Raymond has been pretty active in the New York metropolitan area during the past half century. In that time we have installed foundations for structures of nearly every size and description . . . big, medium, small, we enjoy working on them all. Examples are the New Jersey Turnpike Overpasses, installations along the Hudson River, and at Brooklyn Navy Yard, as well as over 40 apartment projects housing 1/12 of New York's population.

While not shown in the picture, structures at La Guardia and Idlewild Airports, sections of the Major Deegan Expressway and the Bulova Watch Plant also testify to our wide and diversified experience. So does a Raymond-supported handball court at Coney Island, for that matter.

For over 60 years Raymond has completed a variety of contracts in cities and towns across the country. All of this proves that no project is too large or too small for our attention. May we serve you, too?

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CIRCLE 319 ON READER SERVICE CARD

Warehouses Cut Prices on Structurals

Base warehouse prices on structural shapes have been cut in 13 of ENR's 20 price-survey cities. Lower prices stem from an effort to stimulate sales at a time when order backlogs are dwindling.

In 10 of the cities, prices were cut on both fast- and slow-moving items. They are Chicago, Cincinnati, Dallas, Detroit, Kansas City, New York, Philadelphia, Pittsburgh, St. Louis and San Francisco.

In three cities, prices were cut on fast-moving items, but raised on the slow-moving structurals. They are Boston, Los Angeles and Seattle.

The warehouses are no longer quoting a single base price for all standard shapes. They now quote base prices for each particular type of shape, with the quote depending on the turnover of the item involved.

For example, New York City formerly had a single delivered base price of $9.84 for all standard shapes. Now New York warehouses quote several delivered base prices, ranging from $8.12 for the fastest-selling shapes to $8.84 for the slowest-moving items.

Meanwhile, warehouses in nine of ENR's 20 cities are using item and quantity extras that can make small orders more expensive despite the lower base prices.

A 3,000-lb order of 500-lb structural angles now costs $10.37 per cwt delivered in metropolitan New York. The order used to cost $9.84 per cwt.

It's the practice of steel warehouses to add "extras" to the base price of structural shapes. There are two types of quantity "extras." They are:

- **Item quantity extra.** This is becoming more widespread than in recent months. It is an amount per cwt that is added to the base price of any individual structural shape lighter than a certain minimum weight.
- **Order quantity extra.** This has been used by a number of warehouses for some time. It is an amount per cwt added to the total base price of an order for structural shapes below a certain minimum weight.

The following schedules of extras are now effective at warehouses in Chicago, Cincinnati, Cleveland, Dallas, Detroit, New York, Philadelphia, Pittsburgh and St. Louis.

Item Quantity Extras

10,000 lb and over (base price, no extra)

5,000–9,999 lb	$ .10	per cwt
2,000–4,999 lb	.35	per cwt
1,000–1,999 lb	.85	per cwt
400–999 lb	1.75	per cwt
100–399 lb	3.00	per cwt
Under 100 lb	4.00	per cwt

Order Quantity Extras

20,000 lb and over (base price, no extra)

10,000–19,000 lb	$ .10	per cwt
5,000–9,999 lb	.20	per cwt
2,000–4,999 lb	.50	per cwt
1,000–1,999 lb	1.00	per cwt
400–999 lb	2.00	per cwt
Under 400 lb	5.00	per cwt
Under 100 lb ..... (Pittsburgh only)	9.00	per cwt

Machinery Orders Rise 8% Above '59

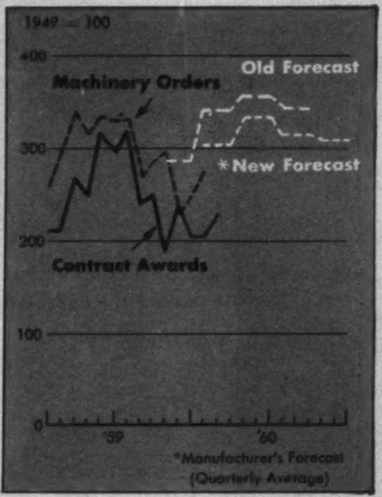
Record January equipment orders raised the New Orders Index to 276 based on an average monthly dollar volume in 1949 as 100. This is 8% above one year ago and tops by nearly 2% the old January record set in 1951.

This second consecutive monthly increase in equipment orders placed with manufacturers reflects the optimism of contractors and distributors. Contractors' new business is recovering from the slowdown caused by the highway stretchout and the steel strike in last year's second half.

The Equipment Orders Index is computed by the McGraw-Hill Economics Department from reports by a sample of construction and mining equipment manufacturers.

Heavy construction contracts reported by ENR have been impressive since the steel mills resumed operation last November. The Contract Award Index for February rose to 223, based on 1949 = 100. This is 7% above a year ago. During the four months from November 1959 through last February, the Contract Award Index average of 215 was 6% above the same period a year earlier.

Strength in housing, the sharp rebound in highways and bridges, and an expected spurt in industrial work point to record volume this year.



Although this year should set a new high in equipment orders, manufacturers now look for less of a rise than they expected as of October 1959. Last month they forecast a 7% gain, the same as ENR forecast for heavy construction contracts, which equipment orders follow closely on the chart.

Manufacturers now predict that the New Orders Index will average 314, with a sharp rise in this year's first two quarters followed by a seasonal decline.

Here is their forecast:

- First quarter, 305, up 20% from last year's final quarter.
- Second quarter, a record 333.
- Third quarter, 312.
- Fourth quarter, 308.

FHA Lumber-Grading Rule Signals Price Boosts

Premium prices for grade-marked lumber and price cuts for unmarked lumber may show up after April 1. That's the effective date for the Federal Housing Administration's new requirement that grade-marked framing lumber be used in all housing financed with FHA-insured mortgages.

The move has already been announced in Atlanta. Contractors in that city will have to pay $15 per Mfb more for grade-marked 2 pine lumber. It's now $85 per Mfb for 2x4s.

FHA-insured housing accounts for approximately 25% of new housing starts. A big market will thus be shut off to unmarked lumber, possibly resulting in some price cuts on this stock.

830 ft. every 9 hrs.

in hard formation with REICHdrill

. . . we've never even come close to this with any competing rig

Construction job performance like this is standard with REICHdrill. Why? Because:

. . . all-hydraulic top-drive rotary provides infinitely variable speed of drill rotation – the right speed for every formation.
. . . direct-drive to drill stem saves power loss.
. . . all air used to drill and clean hole.
. . . no complicated transmission, no rotary table.
. . . no kelly bar – in and out of the hole faster.
. . . instant safety torque release protects all drive components.

REICHdrill has built a reputation for keeping maintenance costs low; footage records high.

And these additional REICHdrill features help set drilling records: masts incline for angle drillings; CP heavy-duty compressors assure plenty of air to meet all demands; fast-acting, ram-type hydraulic leveling jacks permit use of most rig weight for down pressure; CP "Air-Blast" Bits for extra footage in toughest formations.

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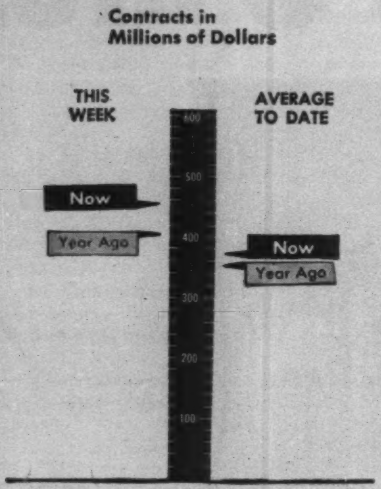
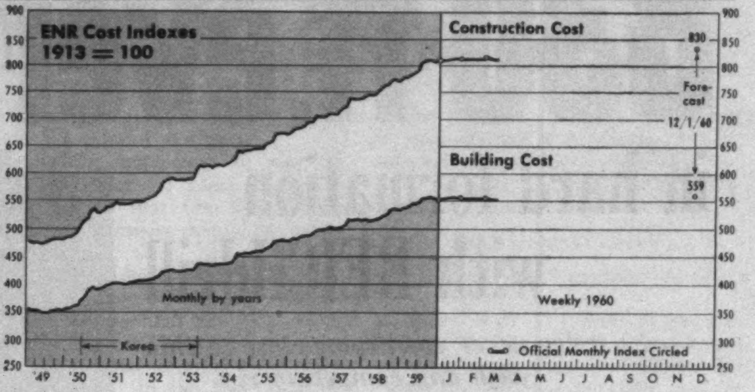
T-650 truck-mounted REICHdrill in operation on construction work. Hole size: to 7⅞"; down pressure: 30,000 pounds. Other models available, truck or crawler mounted, with hole size to 16 inches, down pressure to 90,000 pounds.

CIRCLE 321 ON READER SERVICE CARD

Construction Scoreboard

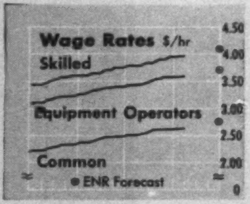
This Week...

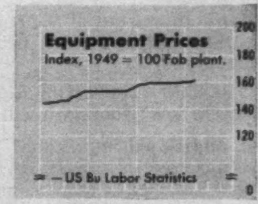


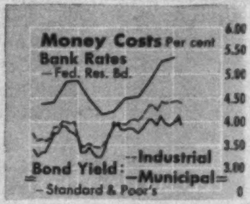


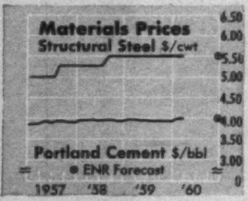
ENR COST INDEXES (1913=100), 20-cities' average	Week of Mar. 17 1960	% Change from Feb. 18 1960	% Change from Mar. 19 1959
Construction Cost	813.17	+0.06	+3.85
Building Cost	554.87	−0.05	+2.37

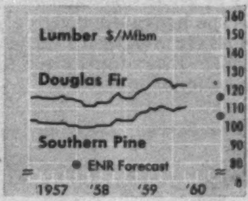
To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

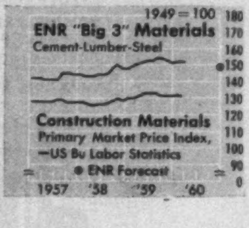












AMOUNT OF CONTRACTS LET

Contracts Awarded In 50 States By Type	This Week (millions)	Cum. 12 wks 1960 (millions)	Chge '59-'60 %
All Heavy Construction	$453.5	$4,285.0	+ 1
By Ownership			
PRIVATE	240.1	2,295.8	+10
PUBLIC	213.4	1,989.2	− 8
State & Municipal	175.1	1,471.2	− 4
Federal	38.3	518.0	−17
By Type of Work			
PUBLIC			
Waterworks	5.6	68.2	−38
Sewerage	11.0	124.8	− 4
Bridges*	19.1	203.6	+37
Highways	81.4	567.1	− 3
Earthwork, Dams & Waterways	19.1	147.3	− 8
Buildings:			
Excl. Housing	44.3	461.2	−19
Housing	16.4	105.4	−20
Unclassified	16.6	312.7	− 4
PRIVATE			
Buildings:			
Mass Housing	99.3	1,082.3	+26
Commercial	90.9	459.4	− 4
Industrial	20.4	529.9	−19
Unclassified	29.4	223.1	+123

*Includes Private bridges

NOTE: Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

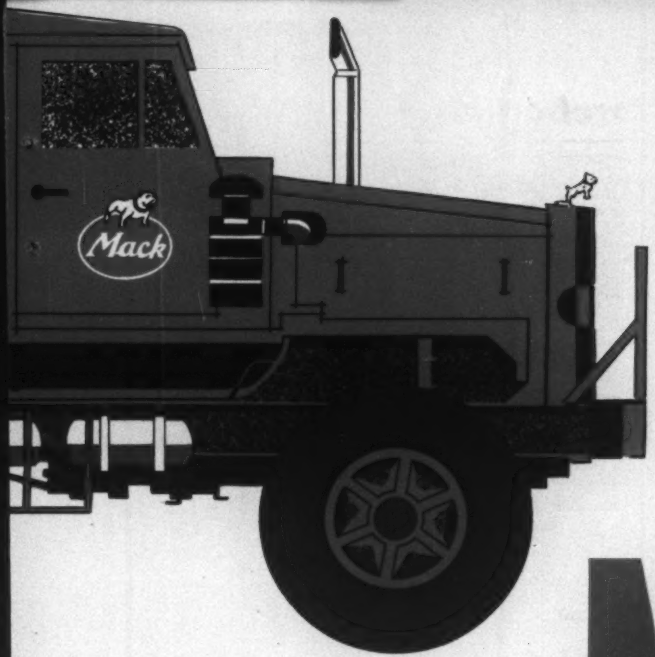
New Construction Capital . . .

	Week of Mar. 17 (millions)	Cum. 11 wks 1960 (millions)	Chge '59-'60 %
Corporate Securities	$ 54.8	$ 526.3	−27
State and Municipal:			
All Except Housing	152.7	1,561.9	+16
Housing	0.3	13.6	−51
Federal Loans	1.5	42.7	+103
Federal Aid	....	....	....
Total Nonfederal	$209.3	$2,144.6	+ 1
Federal Appropriations:			
Projects in U. S.	....	....	....
Outside U. S.	....	....	....
Total New Capital	$209.3	$2,144.6	+ 1

This Month . . .

ENR COST INDEXES IN 22 CITIES, 1913=100

City	Construction Cost Mar. 1960	Construction Cost Percent Change from last Month	Construction Cost Percent Change from last Year	Building Cost Mar. 1960	Building Cost Percent Change from last Month	Building Cost Percent Change from last Year
Atlanta	638.70	0	+7.5	503.16	0	+5.4
Baltimore	739.72	0	+4.0	552.56	0	+1.7
Birmingham	652.68	0	+4.9	516.59	0	+4.3
Boston	833.00	+2.6	+2.8	564.67	+0.3	+2.4
Chicago	918.71	−0.2	+6.0	581.60	−0.2	+2.2
Cincinnati	814.80	0	+3.7	540.30	0	+2.9
Cleveland	920.49	0	+3.0	553.44	0	+2.6
Dallas	604.04	0	+5.4	491.30	0	+4.0
Denver	757.86	+1.8	+3.6	541.94	0	+1.8
Detroit	962.74	−0.2	+7.3	598.96	0	+3.4
Kansas City	798.46	0	+3.4	552.67	0	+2.7
Los Angeles	870.38	0	+5.1	555.99	0	+3.7
Minneapolis	860.16	0	+2.5	569.61	0	+2.8
New Orleans	644.46	0	+4.4	514.06	0	+4.0
New York	1,011.12	+0.2	+4.4	646.69	−0.2	+2.8
Philadelphia	793.09	0	−0.2	579.94	0	+1.7
Pittsburgh	857.54	0	+3.6	608.70	0	+2.3
St. Louis	879.81	−0.3	+3.0	581.06	−0.4	+0.8
San Francisco	851.16	−0.3	+4.1	552.66	−0.4	+2.7
Seattle	859.42	−0.3	+3.5	504.18	−0.5	+2.2
U. S.—20 Cities' avg.	813.46	+0.1	+4.1	555.16	−0.1	+2.8
Montreal	630.39	0	+4.5	458.76	0	+2.1
Toronto	673.01	−0.5	+4.8	498.02	−0.6	+3.3



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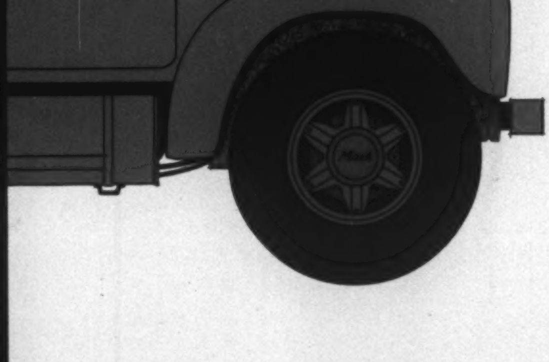

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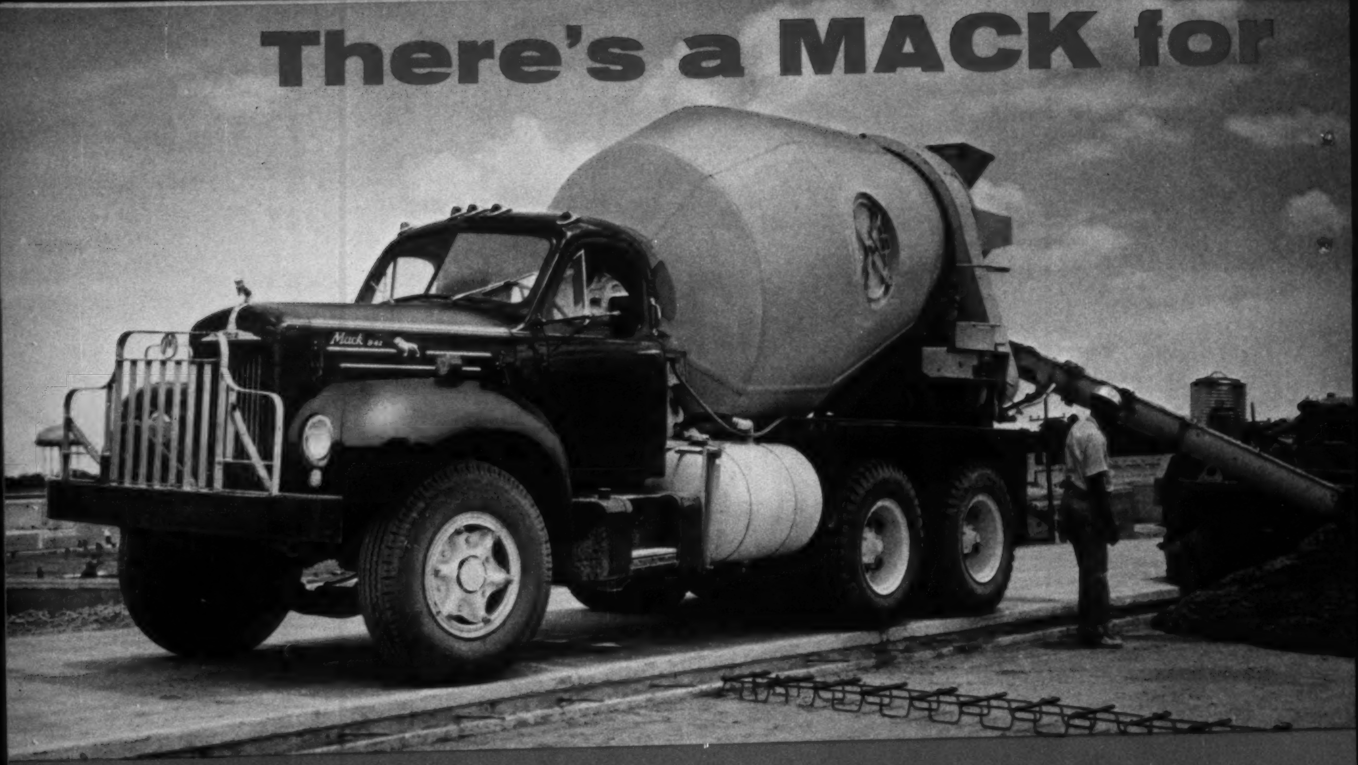
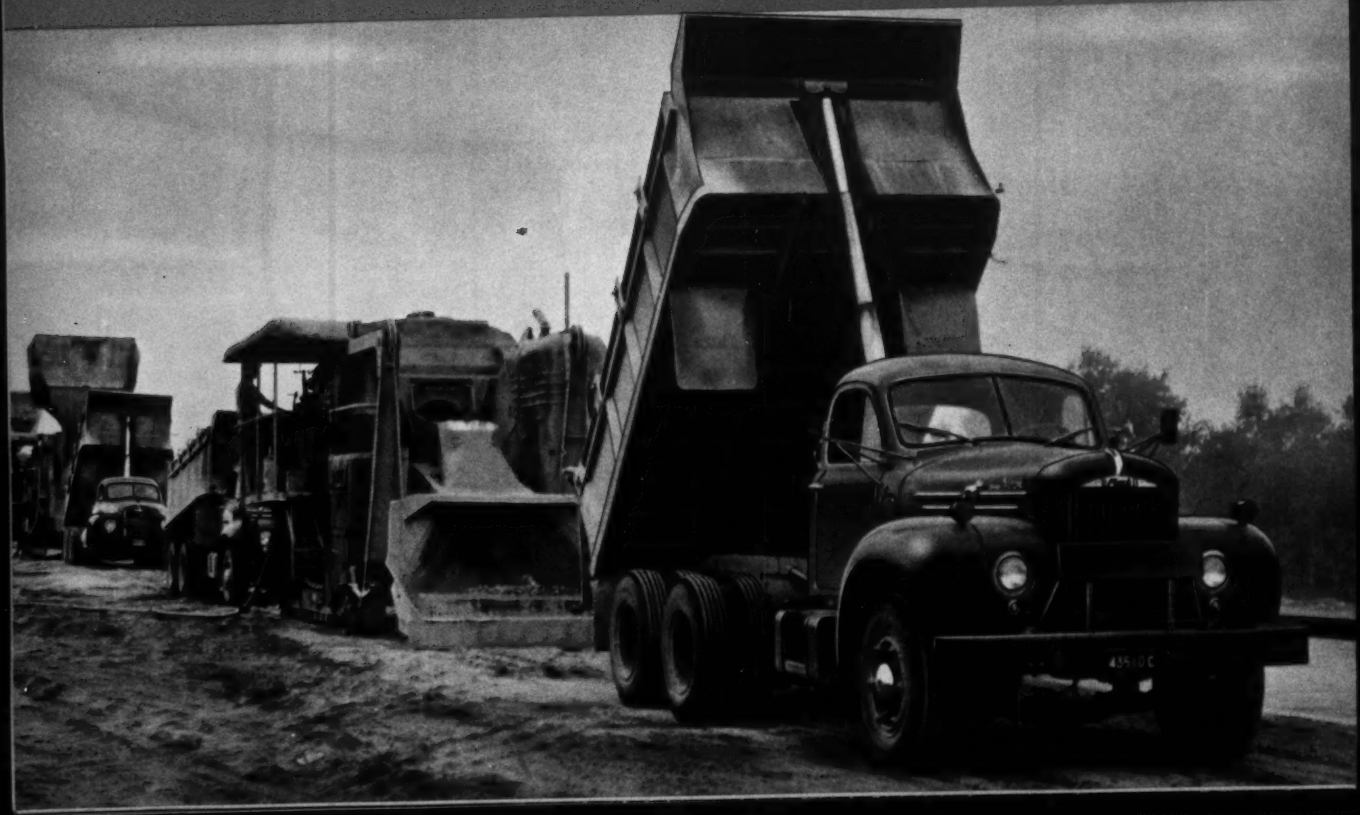
Mack Balanced Design is achieved by engineering and building components which work together with maximum efficiency. Only Mack can offer Balanced Design because only Mack makes all its own major components . . . makes them to standards of ruggedness and precision accomplished nowhere else. Mack Balanced Design results in a truck whose engine, clutch, transmission, axles and suspensions all work in harmony to produce an uncommonly smooth, powerful, responsive unit.

There's a MACK for

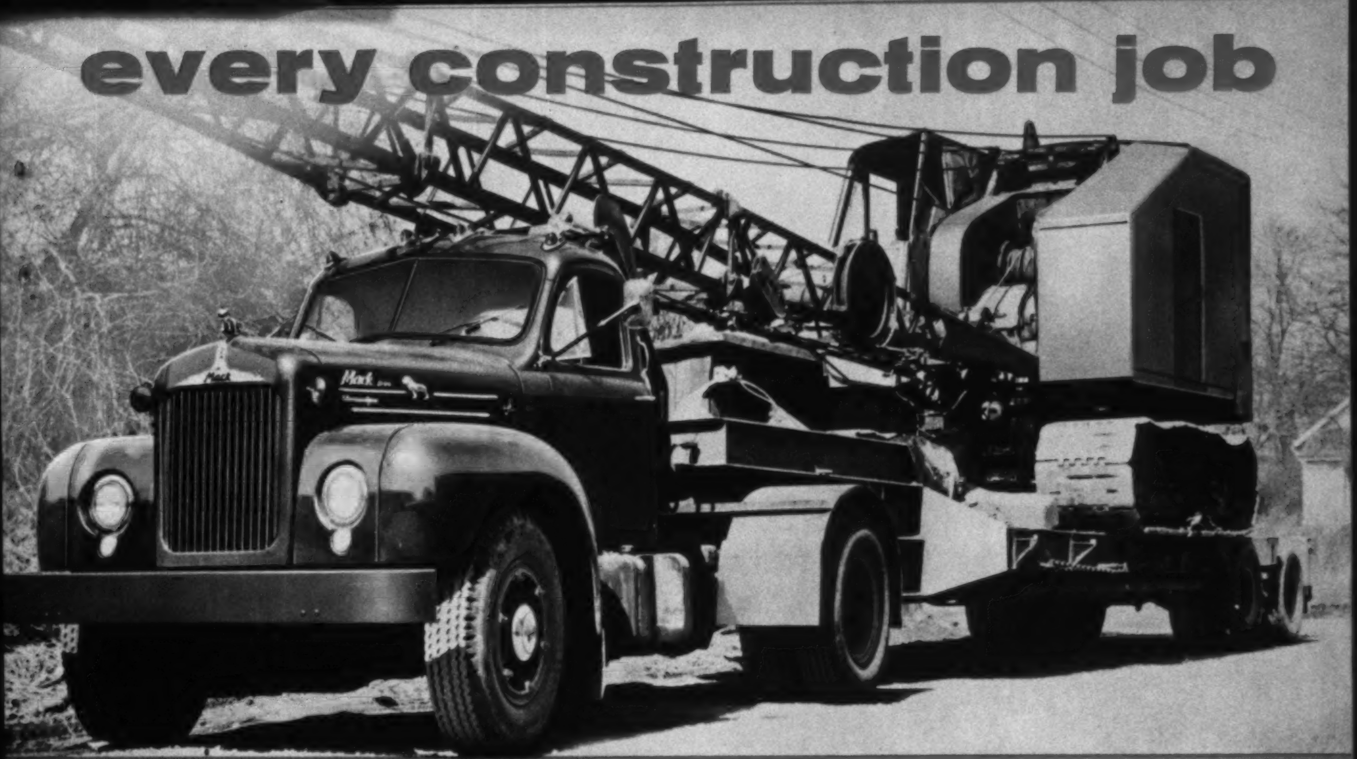


Mack B-40 Series—5 to 10 yards as rear dumpers, 5½ to 7 as mixers

They combine big-truck power, capacity and stamina with small-truck agility and economy for service as dumpers, tractors, mixers and platform trucks. 150 hp Mack Magnadyne gasoline engine. Wide choice of Mack transmissions up to 20-speed units, in on-highway and off-highway versions. Choice of heavy-duty axles and frames that offer standard and optional reinforcement. Option of power steering. Six-wheelers offer Mack Balanced Bogie with Power Divider. All-wheel-drive units as well

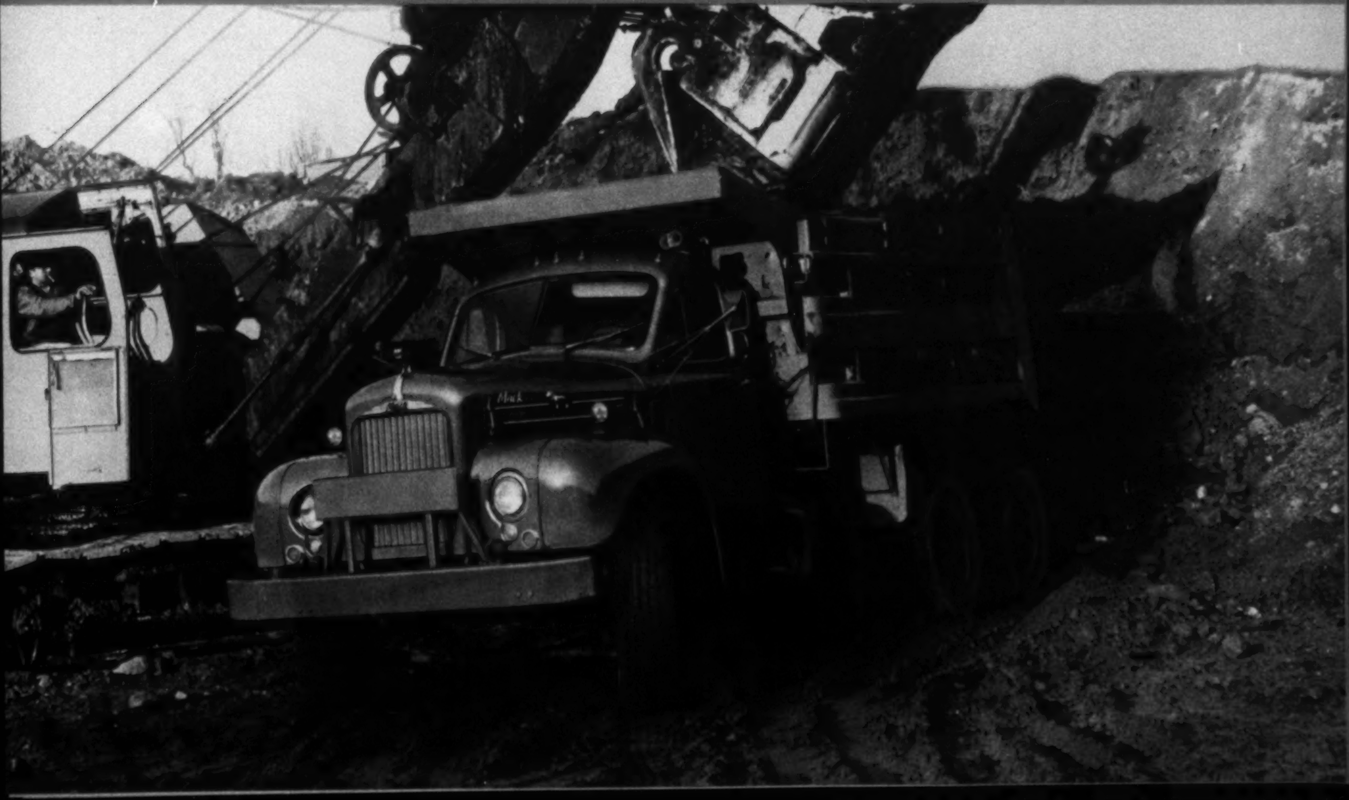


every construction job

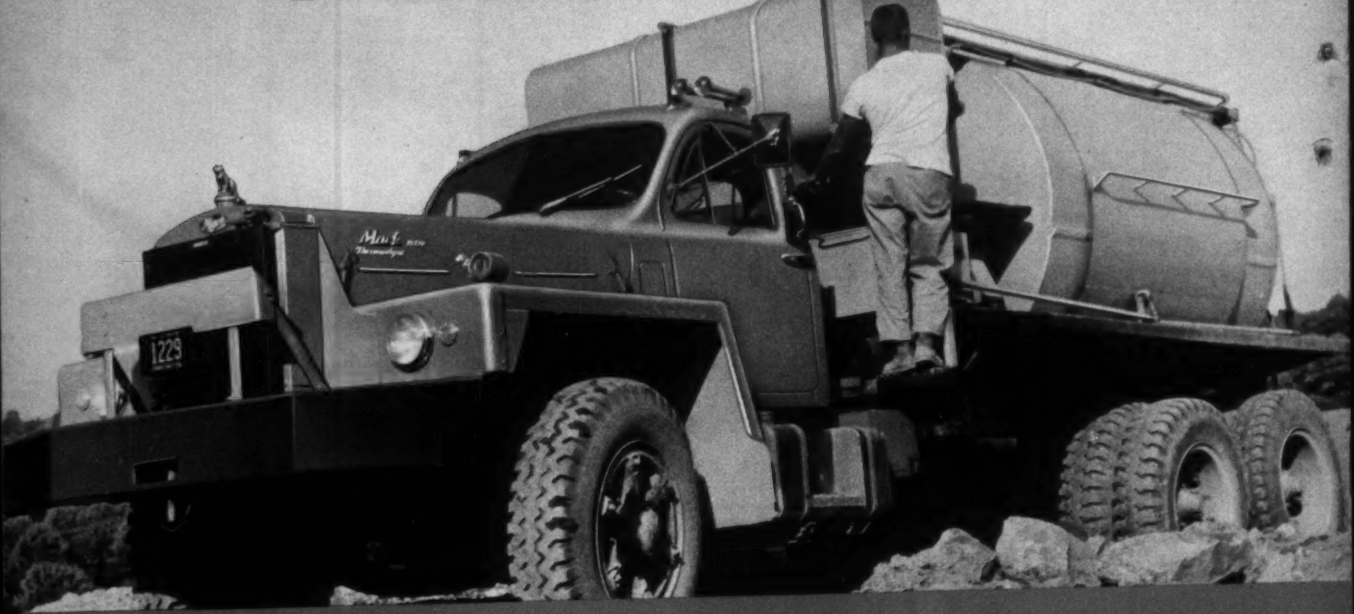


Mack B-60 Series—6 to 12 yards as rear dumpers, 5½ to 8 as mixers

These trucks have hung up records for economy and long mileage life on every kind of job—as dumpers, mixers, tractors and platform trucks. The "workhorse of the industry," they're powered with Mack Thermodyne 185 hp gasoline engines, or Thermodyne diesel engines of 170 or 205 hp. Wide choice of Mack transmissions up to 20-speed units, in both on-highway and off-highway versions (depending on model). Choice of heavy-duty axles as well as frames that offer standard and optional reinforcement. Option of power steering. Six-wheelers feature exclusive Mack Balanced Bogie with Power Divider.



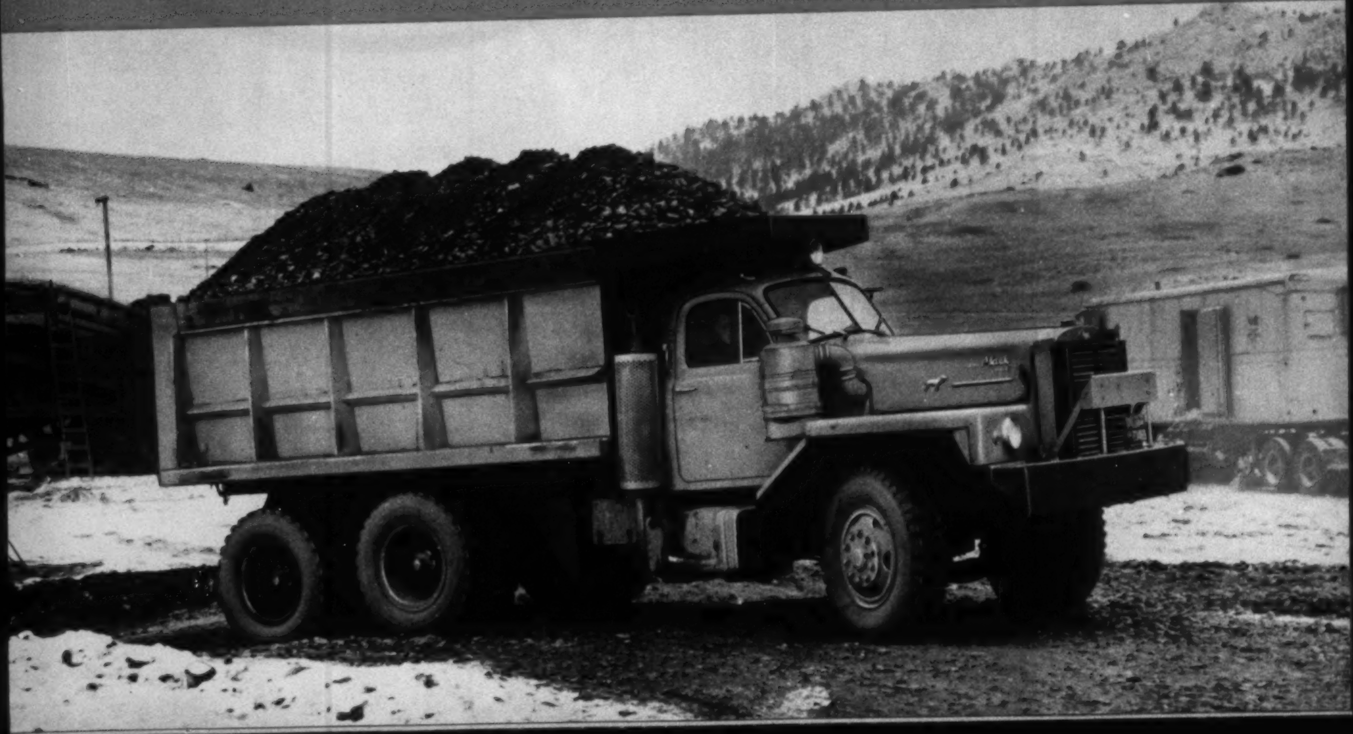
There's a MACK for



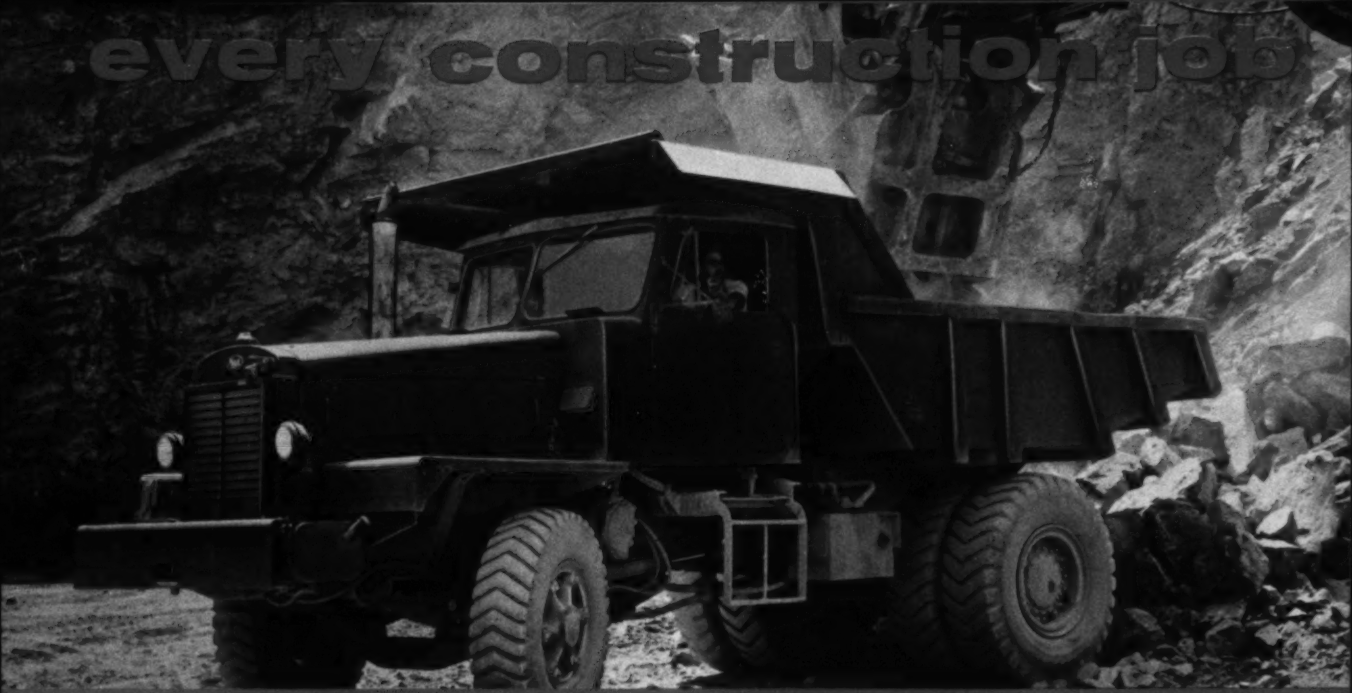
Mack B-80 Series—7 to 14 yards as rear dumpers, 7½ to 10 as mixers

Here's Mack profit-power personified! Big, rugged B-80's can be custom-assembled to meet your needs exactly: as tractors for heavy-duty hauling of platform or dump trailers . . . or as truck chassis for dumper, mixer or utility service. Wide option of power and gear ratios. Available in 4- and 6-wheel models including six-wheel-drive units. Powerful, durable braking power.

Up to 222 hp Mack gasoline or 205 hp Mack Thermodyne diesel engines; up to 335 hp stock diesels. Choice of Mack transmissions including Mack 20-speed Quadruplex. Mack Dual Reduction rear axles and—on 6 wheelers—Mack Balanced Bogie with Power Divider. Power steering standard on Mack front-wheel-drive models. Optional on others.



every construction job

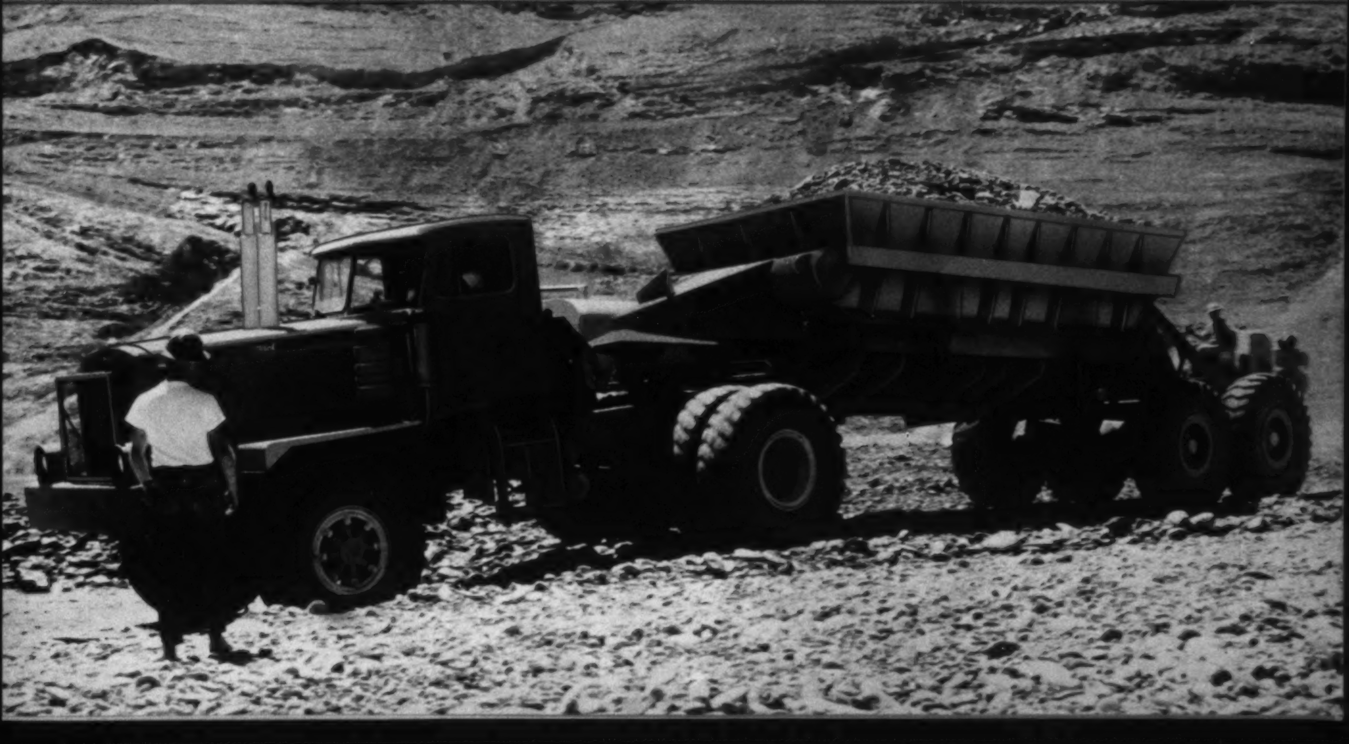


Mack "L" Series—15-40 ton end-dumpers to 50-ton bottom dumper

The Macks in the "L" Series—LRX, LVX, LYSW, and the giant LRVXT tractor which pulls 50-ton bottom dumper—are designed with the power and strength to handle the biggest construction jobs. They shrug off the relentless pounding of big-yardage shovels, and are loaded with features for top performance, long life and freedom from downtime.

Rugged power trains offer up to 450 hp diesel engines . . . Mack overgeared transmissions or torque converters and Mack Planidrive rear axles . . . powerful air brakes of latest design handle steepest descents . . . maneuverability characteristics of smaller vehicles—thanks to ideal power steering and air-assisted clutch.

For end-dumper capacities up to 40 tons, where maximum flotation is required, a full line of tandem rear axle Macks is available.

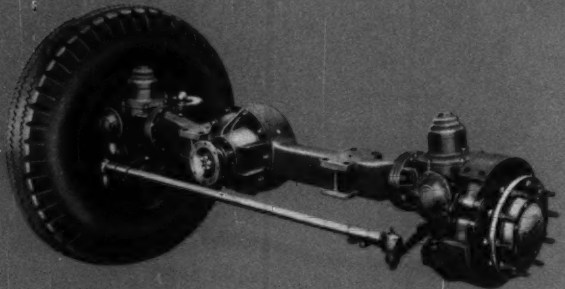


MACK BALANCED DESIGN

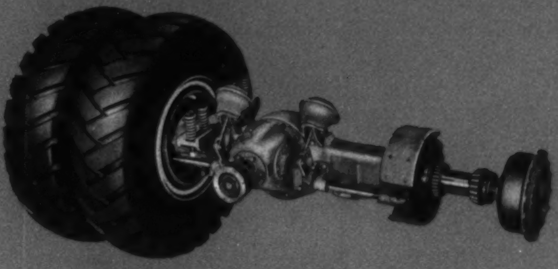
MACK
for over 6 straight years
NO. 1
by far in sales of
diesel trucks

means components integrated for longest prime of life.

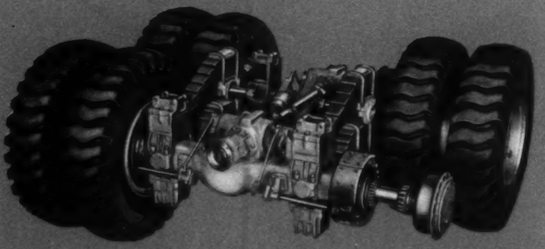
Only Mack offers these exclusive quality components:



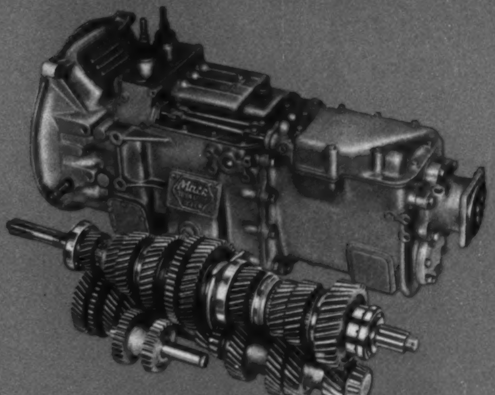
Strong Mack-built axles
Mack's drop-forged I-beam front axles are made super strong for long, trouble-free service. Extensive use of heat-treated steels for crucial parts means minimum maintenance. And Mack's exclusive **front-drive axle** (shown above) for all-wheel-drive trucks offers the greatest ground clearance and strength of any made—with all parts fully enclosed.



Durable Mack-built 2-wheel rear axles
Mack's two-wheel, rear-axle assemblies have an unmatched reputation for service under strenuous conditions. Dual Reduction carrier and Mack's famous Planidrive gear reduction at the wheel hubs provide the smooth distribution of power vital to top truck performance.



High-traction Mack-built Balanced Bogies
Macks perform where other trucks bog down—in mud, loose gravel or sand—thanks to Mack's exclusive Balanced Bogie with Power Divider—a 4-wheel drive, tandem rear-axle assembly with an inter-axle differential that distributes the power to wheels with greater traction. To achieve maximum road clearance in larger units, Mack Planidrive final reduction gears in all 4 hubs eliminate the need for outsized carriers and low-slung differentials.

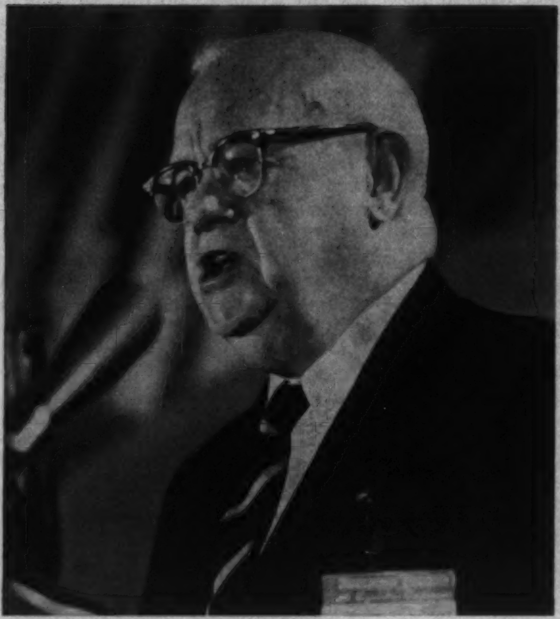


Long-lived Mack-built transmissions
Service records prove that Mack transmissions—like this 20-speed Quadruplex—stand up to heavy-duty hauling far longer and need less attention than any others—thanks to the use of the finest gear metals known... to painstaking precision manufacture... and to exclusive Tetrapoid gear design that gives maximum strength, longer life and smoother action. Five- to twenty-speed units, each with ideal ratio steps.

MACK FIRST NAME FOR TRUCKS

Mack Trucks, Inc., Plainfield, New Jersey. In Canada: Mack Trucks of Canada, Ltd., Toronto, Ontario

Printed in U.S.A.



RICHARD GRAY: A last word from the originator.

SECRETARY MITCHELL: A good word for the building trades.

'Education' on Capitol Hill

Union efforts to obtain a change in the current restrictions against picketing at common construction sites appear to have become the victim of political expediency—at least temporarily.

There's apt to be no labor legislation of any kind during this election year. So said Richard Gray on the closing day of the sixth Annual Legislative Conference of the AFL-CIO Building and Construction Trades Department, held in Washington, D. C., last week, thus pricking the bubble of union optimism.

It was the general feeling, however, that the picketing measure has enough bipartisan support for passage if it gets on the floor. And Presidential aspirant Sen. John Kennedy (D., Mass.) gave the union group his assurance that "we will not adjourn until that provision has been brought to a vote."

Two days later, however, Rep. Phil Landrum (D., Ga.) threw up another roadblock to the measure by scheduling hearings on another matter before his subcommittee of the House Education and Labor Committee. That will further delay action by the full committee on the picketing provision, already favorably reported by the Perkins subcommittee.

The measure represents the building trades' No. 1 legislative goal for 1960 in what Sen. Hubert Humphrey (D., Minn.) called "a genuine public interest program." The national interest it has generated and the Administration and congressional support it has won demonstrate better than any other current issue what the legislative conference is all about and what it means to the construction industry.

This year, the building trades have come up with a six-point legislative program: The picketing proposal, commonly referred to as reversal of the Denver Building Trades case; significant changes in the Davis-Bacon Act on prevailing wages; Taft-Hartley amendments to kill right-to-work laws, eliminate the mandatory injunction and reverse the stiff and controversial Brown-Olds remedy used against contractors and unions by the National Labor Relations Board in illegal hiring cases; bold and comprehensive legislation for housing, schools and depressed areas.

AFL-CIO President George Meany and Mr. Gray described the total program as one that "will assure continuous prosperity for all of the American people." They denied that it is a special interest program and claimed its construction aspects would sufficiently stimulate the nation's economic growth to pay for itself without taking a larger share of the country's taxes.

The conference delegates spent a day and a half on Capitol Hill explaining the program to members of Congress on the theory that they will support it if they understand it. Balance of the four-day meeting was held in the great hall of the Sheraton-Park Hotel. There, the building tradesmen were personally greeted by more than a dozen prominent politicians and Administration officials, including Labor Secretary James Mitchell and all the leading candidates for the Democratic Presidential nomination.

Sen. Pat McNamara called the annual conference an "established institution," and others gave it high praise as a generator of public understanding, cooperation and good-will.

Some of the biggest accolades came not from active campaigners but Administration officials. Secretary Mitchell, for example, said the building trades tell on Capitol Hill "a story of sound trade unionism which no other group in the United States can present." NLRB General Counsel Stuart Rothman, who incidentally presented a fairly good legal justification for the picketing proposal, expressed the hope that "we can continue to meet" for discussion of mutual problems.

Credit for the conference was unanimously given to retiring President Gray, whose "entire official life," said Sen. Thomas Kuchel (R.; Calif.), "has been star studded for courage, for honesty and fair dealing."

"I must say," Senator Kennedy added, "that he has protected the interests of his members and at the same time has been most understanding of the responsibilities of those of us who serve in the United States Congress."

The two most controversial areas in which the dividends of this approach were most apparent last week were situs picketing and prevailing wages. Both present highly technical and complicated problems, but after years of "explanation" the building trades now find a number of influential legislators thinking along their lines.

Senator Kuchel, for example, had this to say on picketing: "The situs picketing legislation is unquestionably in the public interest. . . . (It) does not legalize secondary boycotts . . . (it) does not permit economic actions removed from the site of construction . . . (it) is not special interest legislation . . . It will simply give building tradesmen a measure of relief from indefensible and unfair restrictions . . . (that) have seriously impeded the protection of existing labor standards . . ." That legislation, Secretary Mitchell said, has "the firm support of the Administration."

Effect of the legislation would be to reverse the Supreme Court's Denver decision. (Under the Denver decision a strike at a construction site where more than one contractor is working becomes a secondary boycott if the workers of a neutral employer honor the picket line—an almost inevitable situation.) The building trades claim this would give them the same right to protect wages and working conditions that industrial unions enjoy. They say their union rights should not be hobbled by legal niceties that do not fit the peculiar nature of construction jobs.

But for a point of order under parliamentary rules, the unions might have obtained the legislation last year when the Landrum-Griffin labor bill was passed. However, there is convincing evidence that a legislative commitment does exist to put the issue on the floor of Congress. Labor thinks it can be passed if it reaches the floor. Even if the legislation is bottled up for the rest of the year, few doubt it would have come so close to passage as it has were it not for the legislative conferences.

The same seems to be true with respect to prevailing wages. Although the unions have not yet been able to get a consolidated Davis-Bacon law, Congress has gotten quite used to its piecemeal extension, as Davis-Bacon inclusion in the favorably reported Thompson school-aid bill illustrates.

Labor's goal is a single law that covers federally assisted as well as direct federal construction, and that calls for the payment of prevailing fringe benefits and overtime as well as prevailing hourly rates. Pending legislation would also extend the law to architects, technical engineers, draftsmen and technicians, centralize enforcement of the law and set up a Construction Appeals Board to review wage determinations and enforcement action.

Outright repeal of the law is being sought by a number of employer groups. Sen. Kuchel said this campaign is being conducted under the "ridiculous" theory that the law is outmoded. All from Capitol Hill who spoke on the issue supported the Kuchel position and the building trades' goals.

Those who wonder what the legislative conferences amount to in the form of tangible results need only look at the past.

Within the last few years the building trades have chalked up these gains: a prevailing wage provision in the Federal Highway Act; legalization of prehire agreements; a hot-cargo exemption; a seven-day union shop; legalization of referral standards; validation of employer contributions for apprenticeship.

Said President Gray: "I am convinced that these yearly legislative conferences have proved of tremendous value. They have enhanced the prestige of the trade union movement on Capitol Hill, and they have become more and more effective each year."

From last week's display, it was evident that the building trades have built up a sizable amount of legislative momentum. This promises to affect construction industry labor legislation for some time to come.

New Anti-Discrimination Rules Coming

Contractors on federal projects everywhere will soon feel the impact of a decision made last week by the President's Committee on Government Contracts.

The anti-discrimination group voted to enlarge its campaign against racial bias in the construction industry requiring government contractors generally to furnish monthly data on their hiring practices and hiring timetables.

Under the plan, government construction agencies will notify all their general contractors to report each month, on a racial basis, the hirings, firings, promotions and demotions during the last 30 days, plus the planned schedule of hiring for each trade on the project. The general contractor will be responsible for data on subcontractor hiring and on qualifications required for workmen in each craft.

The plan applies only to the construction industry. It recognizes the ineffectiveness of the committee's standard but time-consuming complaint procedure when applied to jobs of relatively short duration.

Franklin G. Floete, head of General Services Administration, has already declared that monthly reports will be required from all contractors on federal building jobs under his jurisdiction. The other cooperating agencies—the Defense and Interior departments, Atomic Energy Commission, Bureau of Public Roads and Federal Aviation Agency—will put the plan into effect under procedures now being determined.

The committee's decision grew out of GSA efforts to break down racial bias affecting electrical workers for two federal building projects in the District of Columbia (ENR Mar. 17, p. 101).

Under terms of their contracts with the government, the general contractors and all subcontractors on the two jobs are required to hire qualified workers without discrimination as to race, color or creed. Both projects operate as union-shop jobs, giving a nonunion employee the Taft-Hartley grace period of 30 days before he has to become a union member. The electrical contractors, however, have job referral agreements with the local union, and they fear a walk-out if a man not referred to them by the union is hired.

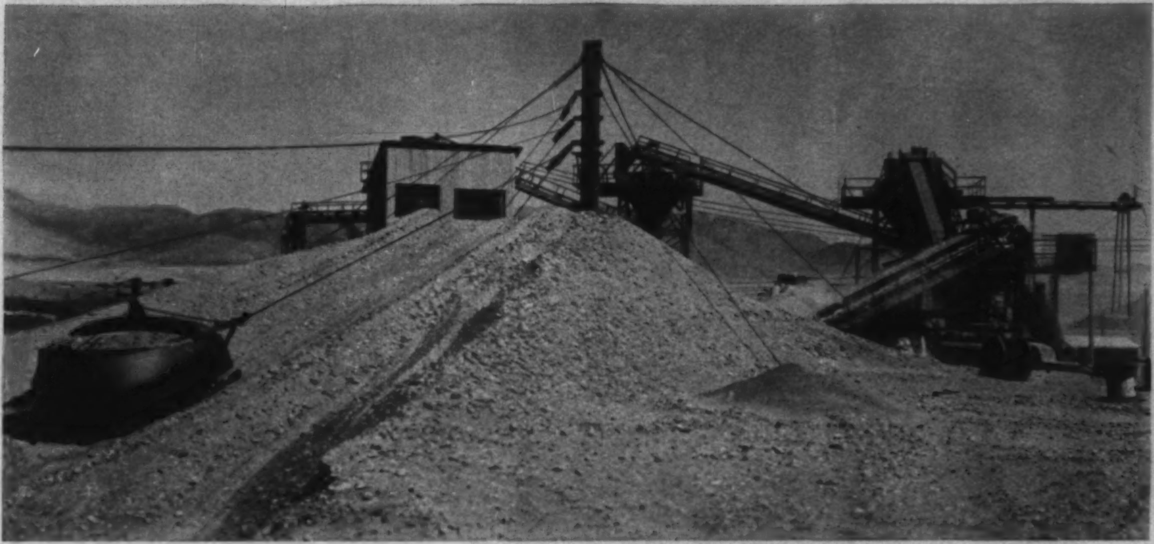
The committee, after considering the GSA request for authority to move on the two Washington projects, decided not to localize the plan but to broaden its scope to cover all government construction. A motion to that effect was approved by the group, including members from the affected agencies.

The action occurred two days after failure of Administration efforts to strengthen the committee through an mendment to the civil rights bill.

The Administration proposed that Congress re-establish the committee as the "Commission on Equal Job Opportunity Under Government Contracts." Members of the commission would be appointed by the President. Powers of the commission, however, would be about the same as those of the committee. Only difference is that the commission's recommendations would stem from the broader base of congressional authority.

(*Labor continued p. 332*)

ONE TON FOR 6 CENTS...Total Digging and Hauling Cost with a Sauerman



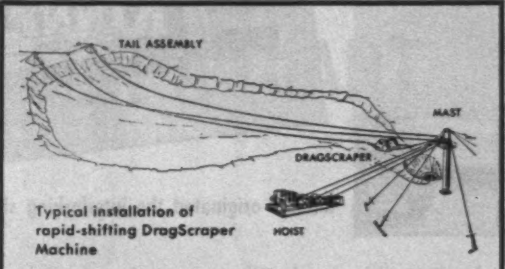
Dig and haul from your high bank, deep pit or underwater deposit direct to plant hopper or stockpile for 6 cents per ton. This cost is based on current job figures for Sauerman DragScrapers operating over average depth and haul distances.

The reason: one man and one machine handle the entire job. You save money three ways over multiple machine methods. Your power costs are much lower. A single operator replaces two or more on your payroll. Your maintenance costs are much lower because only the DragScraper Bucket and cable contact the material handled.

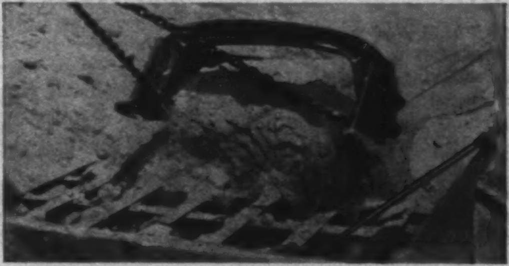
If you are hauling over distances up to 800 ft. or digging under water at depths to 100 ft.—the Sauerman DragScraper Machine is the most economical means you can use.

You can get DragScraper Machines in sizes from ⅓ to 15 yds. to match your tonnage requirements. Write or call about the physical dimensions of your deposit. We'll recommend the proper machine. For general information and detailed data on specific installations request Catalogs A and SG-1.

Plant Operators Are Saving On Power, Labor And Maintenance With Sauerman DragScraper Machines



Typical installation of rapid-shifting DragScraper Machine



DragScraper Bucket deposits load of sand onto grizzly hopper.

SAUERMAN BROS., INC. 632 So. 28th Ave., Bellwood, Illinois
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks

Send *Today* for this New Data on *Upward-Acting* Doors for Every Need

interlocking slat curtain
Kinnear slats—steel (zinc-coated*) aluminum and other metals
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KINNEAR ROLLING DOORS
STEEL or ALUMINUM
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Kinnear originated the interlocking slat door

Get full details on this complete line of time-saving, cost-slashing doors. They add highest efficiency to space-saving, coiling upward action. Kinnear offers a wide choice of flat and curved slats—fabricated of aluminum, zinc-coated steel, or other metals. They fit every need, from small counter openings to largest doorways. Slat sizes range up to the seven-inch "Goliath" slat at the extreme left, above — maximum protection against wind, weather, intrusion or vandalism!

Zinc-Coated *Dual* Protection

Kinnear Steel Rolling Doors feature extra-heavy hot dip galvanizing! 1¼-ounces of pure zinc per square foot of metal (in accordance with ASTM standards). And Kinnear's special phosphate treatment makes this zinc surface ready *immediately* for thorough paint grip.

Make sure you get this complete door guide — check it *now!*

KINNEAR ROLLING DOORS
Saving Ways in Doorways

The KINNEAR Mfg. Co.
FACTORIES:
1820-40 Fields Ave., Columbus 16, Ohio
1742 Yosemite Ave., San Francisco 24, Calif.
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Employment Is Up

New February record set—but not for construction

Business prospects for construction and industry begin to take on a rosier hue than the somber tones they had been painted in all winter. Several recent developments are leading government economists to forecast a smart rise in business this spring.

Helping to revive the optimism is the latest government employment report showing marked improvement in job hiring during February and a drop in unemployment.

Running counter to seasonal trends, employment rose half a million to reach a new February record total of 64.5 million. Unemployment declined by 218,000 to 3.9 million.

For the construction industry, seasonally adjusted employment figures remained just about level from January to February instead of taking the sharp drop that is normal for this time of the year.

Government economists are interpreting these signs bullishly. While cautioning against placing too heavy emphasis on a single month's showing, they nonetheless felt that the underlying economy is showing great strength.

The employment figures came on top of two other heartening developments: The Commerce survey showing a 14% pickup planned in new plant construction and equipment buying; and distinct signs of an easing of tight money conditions, making more funds available for long-term construction programs.

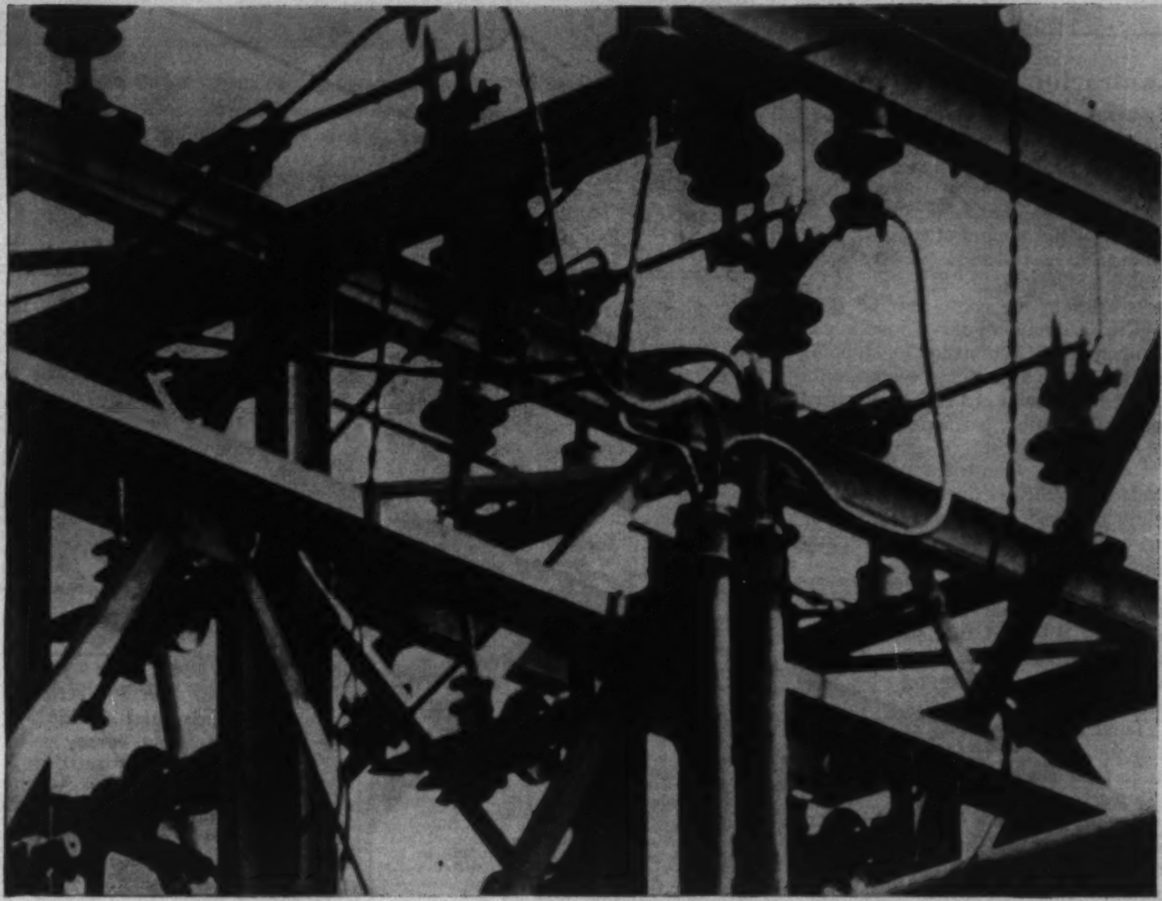
All these plus signs help offset the news about a decline in the stock market and a slowdown in auto and steel production. It had produced some uncertainty over the business outlook.

The government experts noted that still ahead are such business stimulants as the expected pickup in spring construction, agriculture and mining, and retail trade, delayed by the late Easter.

Construction employment in February tallied 2,377,000; this was 70,000 below January employment. On a seasonally adjusted basis, there was no change between the two months. The February total, however, was considerably less than the February 1956 and 1957 figures of 2,480,000 and 2,505,000, respectively.

For the economy as a whole, the percentage of people out of work dropped below 5%—the first time this has occurred (except briefly last May) since before the 1957-58 recession. The unemployment rate declined to 4.8%.

(*Labor continued* p. 334)



NERVOUS SYSTEM FOR A GIANT

The Giant, in this case, is a vast nuclear workshop. The "nervous system" covers many acres and was installed by Lord Electric Company, Inc.

Even engineers sometimes take for granted the fantastically exacting skills necessary to set up electrical ganglia such as these. Here is energy to shake the earth; controlled, measured, meted out in thousands of delicate ways, with an accuracy that often defies the imagination.

And not only for atomic energy. Most of Lord's contracts these days—for factories, laboratories, missile facilities, schools, skyscrapers or airports—involve electrical installations of awesome complexity and a bewildering variety of uses.

With its 65 years of experience in 32 states and Puerto Rico, excellent labor relations throughout the Country, strong resources and an enviable record of reliability and integrity, Lord is a wise and logical choice for your next electrical installation.

LORD
ELECTRIC COMPANY, INC.
Electrical Contractors to the Nation Since 1895

BOSTON • NEW YORK • RICHLAND, WASH. • PITTSBURGH • PORTLAND, ORE.

CIRCLE 333 ON READER SERVICE CARD

Contractor Told to Pay Partial Disability Claim

A Rhode Island construction firm has been told by the state's Supreme Court that a worker's right to compensation for partial disability is not limited in any way by the amount of compensation he may have collected previously for total disability.

As a result, the contractor has been held in contempt of the Rhode Island Compensation Commission for stopping payments to a Providence worker after paying him a total of $12,000 in partial and total disability payments, beginning in 1946.

E. Turgeon Construction Co. contended that the law in effect when the injury occurred placed a $12,000 ceiling on the amount of compensation a worker could recover.

The court ruled that the $12,000 limitation applied to total disability payments only and that payments for partial disability were limited to 800 weeks with no ceiling on the total amount.

Turgeon had paid $2,556 for total disability and $9,444 for partial disability (a total of $12,000) over a period of 652 weeks.

Present state law puts a limit of $16,000 on total disability payments and of $22 a week, up to 800 weeks, for partial disability payments.

Aptitude Testing Chart For Plumbing Apprentices

A new aptitude chart for the selection of apprentices in the plumbing industry has been developed by the National Plumbing Apprenticeship Committee.

The chart lists eight areas of interest and aptitude against which an apprentice's qualification for work in the plumbing trade can be checked.

It is called "Selecting The Prospective Apprentice" and is distributed jointly by the Apprenticeship Committee of the National Association of Plumbing Contractors and the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry, AFL-CIO.

One of the objects of the chart is reduction of the waste and errors in the hit-or-miss selection of apprentices.

Areas that the chart recommends for exploration are: education and training, acquired skills and experience, social and economic factors, personal traits, physical condition, leisure activities, potential skills and interest in the trade.

NAPC says each of these test areas can be analyzed by reliable tests and interview procedures.

OFFICIAL PROPOSALS

RATE: The rate for Official Proposal advertising is $2.40 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

CLOSING DATE: Friday 10:30 A.M. for issue dated the following Thursday.

SEND COPY TO: Official Proposal Division, Engineering News-Record
P.O. Box 12, New York 36, N. Y.

Bids: April 12, 1960.

Venturi Meters

CONTRACT 458

SEALED BIDS will be received by the Board of Water Supply, at its offices, thirteenth floor, 120 Wall Street, New York City, until 11:00 A.M., Eastern Standard Time, on Tuesday, April 12, 1960, for Contract 458, for furnishing, testing and delivering stainless steel venturi meters, together with their instrument assemblies and appurtenances, complete in every respect and ready for installation, all as set forth in the specifications. One 143-inch by 102-inch venturi meter and one 24-inch by 18-inch venturi meter will be required for the Release Water Works at the Cannonsville dam, and one 108-inch by 72-inch venturi meter will be required for the Outlet Works of the West Delaware tunnel.

No bid will be received and deposited unless accompanied by a certified check upon a National or State bank, drawn and made payable to the order of the Comptroller of The City of New York, in the amount of fifteen thousand dollars ($15,000.00), for the proper execution of the Contract.

Pamphlets containing information for bidders, forms of bid and contract, specifications, contract drawings, requirements as to surety, etc., can be obtained in the Secretary's office, Room 1312, at the above address, upon application in person or by mail, by depositing the sum of $5.00 for each pamphlet. Within 30 days following the award of contract or rejection of bids the full amount of such deposit will be refunded for each pamphlet submitted as a bid and a refund of $4.00 will be made for each other pamphlet returned in acceptable condition. Arrangements will be made whereby prospective bidders desiring blueprints of the contract drawings for their own use may secure same, the cost thereof to be paid by them. For further particulars apply at the office of the Chief Engineer, at the above address.

ARTHUR C. FORD, President, EDWARD C. MAGUIRE, HERBERT M. ROSENBERG, Commissioners; Board of Water Supply; BETTY COHEN, Acting Secretary.

Bids: April 14, 1960

The Furnishing and Delivery of Generator Hatch Cover Frames for Tuscarora Power Plant

POWER AUTHORITY OF THE STATE OF NEW YORK
NIAGARA POWER PROJECT
ADVERTISEMENT FOR PROPOSALS
SPECIFICATION NO. PA-N-23027
NIAGARA CONTRACT NO. NP-40

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for the Furnishing and Delivery thereof, F.O.B. University Siding, Tuscarora Power Plant Area, Niagara Falls, New York, for twelve (12) two-section, mobile, unit hatch cover frames for the Tuscarora Power Plant in Lewiston, Niagara County, New York, until 10:30 A.M. Eastern Standard Time on the 14th day of April, 1960, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place proposals will be publicly opened and read aloud.

Bids will be received for furnishing and delivery of twelve (12) Hatch Cover Frames complete with appurtenances for the twelve (12) Unit Generators for the Tuscarora Power Plant. The total weight of the Hatch Cover Frames is approximately 300 tons. Erection at the site of installation will be done by others. First delivery will be required June 1, 1960.

All work shall be completed on or before January 23, 1961.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Ten ($10.00) Dollars, per initial set of contract documents, and Five ($5.00) Dollars per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 per cent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-N-23027

Bids: March 25, 1960

Rip-Rap for Pier Protection Townsends Inlet Bridge Avalon, New Jersey

CAPE MAY COUNTY BRIDGE COMMISSION
NEW JERSEY
ADVERTISEMENT FOR PROPOSALS

March 10, 1960

Sealed bids for furnishing and placing rip-rap protection at Pier 1 of the Townsends Inlet Bridge near Avalon, New Jersey, will be received by the Cape May County Bridge Commission in its offices at Cape May Court House, New Jersey, until 2:00 P.M. Eastern Standard Time on March 25, 1960, and then at said place, publicly opened and read aloud.

The Information for Bidders, Proposal, Contract, Contract Bond, Plans and Specifications may be examined at the office of the Commission, First National Bank Building, Cape May Court House, New Jersey, and at the office of Howard, Needles, Tammen & Bergendoff, Consulting Engineers, 99 Church Street, New York 7, New York.

Contract documents will be furnished for $5.00 for each set, upon application to the Commission or to the Consulting Engineers. The payment will not be refunded and contract documents are not required to be returned.

The Contract will be awarded or the proposals rejected within thirty (30) days from the date of opening proposals. The Commission reserves the right to waive any informalities in and to reject any or all bids.

Cape May County Bridge Commission
Robert J. Campbell, Chairman

Guatavita Project

EMPRESA DE ENERGIA ELECTRICA DE BOGOTA
NOTICE TO TENDERERS

The Empresa de Energia Eléctrica de Bogotá intends to invite tenders for the construction of the Guatavita Dam. The work comprise a one million m3 earthfill dam, a 100 000 m3 earthfill dike, a 60 meter deep, semiplastic cut-off, about 11 000 m2 in vertical area, a 200 m long, 3.20 m diameter concrete lined diversion tunnel, a three km long new channel for the Tominé river and related structures.

The foreign currency requirements for this project are financed by an IBRD loan.

Contractors who would be interested in the invitations to tender should send full particulars of their experience in earth dam construction and in the construction of deep cut-offs to the Consulting Engineers, OLAP-INGENIERIA, Apartado Aéreo 5099, Bogotá, Colombia.

Invitations to tender will be available on April 1. Tenders are to be based on firm unit prices.

OFFICIAL PROPOSALS

Bids: April 14, 1960

Refuse Incinerator Plant

NOTICE TO BIDDERS
FOR THE
TOWN OF EASTCHESTER
WESTCHESTER COUNTY, NEW YORK

NOTICE IS HEREBY GIVEN that the Town Board of the Town of Eastchester, Westchester County, New York will receive separate sealed bids for the:

BUILDING CONSTRUCTION	CONTRACT NO. 1
FURNACES & EQUIPMENT	CONTRACT NO. 2
HEATING SYSTEM	CONTRACT NO. 3
PLUMBING SYSTEM	CONTRACT NO. 4
ELECTRICAL SYSTEM	CONTRACT NO. 5
CHIMNEY	CONTRACT NO. 6

for the construction of a building and appurtenant structures, complete with site improvements, for the new refuse incinerator.

Bids will be received by the Town Board at the Town Offices, 40 Mill Road, Eastchester, Westchester County, N. Y., until 8 o'clock P.M., Eastern Standard Time, April 14, 1960, and then at said place publicly opened and read aloud.

The information for Bidders, Form of Bid, Form of Contract, Plans, Specifications and Form of Performance Bond may be examined at the office of the Town Clerk, 40 Mill Road, Eastchester, N. Y., or the office of the Consulting Engineer, and copies thereof may be obtained upon payment of Twenty-five ($25.00) Dollars for each set. Any bidder, upon returning such set in good condition within thirty (30) days after the award of contract or rejection of bids, will be refunded his full payment, and any non-bidder upon so returning such set in good condition within the same period of time will be refunded Ten ($10.00) Dollars. Checks given as deposit on plans and specifications shall be made payable to the Town of Eastchester.

In general, the work included in Contract No. 1 consists of the construction of a building and appurtenant structures complete with site improvements, for a new refuse incinerator plant of 200 tons per day capacity. Contract No. 2 covers the installation of furnaces and mechanical equipment. The heating, plumbing and electrical installations are to be executed under Contracts 3, 4 and 5 respectively, and the erection of the chimney under Contract No. 6.

Each bidder must deposit with his bid, an amount of not less than Five (5%) percent of the base bid in the form of cash or a certified check, (bid bonds will not be accepted in lieu thereof) subject to the conditions provided in the Information for Bidders. In addition, a Consent of Surety, signed by an acceptable Corporate Surety Company, shall be executed in the form accompanying the bid.

The Contractor will be required to comply with all provisions of the Labor Laws of the State of New York.

Contractor will be required to provide a performance and payment bond (100% of the accepted bid), property damage and public liability insurance with the provision to hold the Town of Eastchester harmless for any accidents occurring during the construction period.

All bids must be submitted in exact conformity with the "Form of Bid" in the Specifications. Bids must be submitted in sealed envelopes, bearing on the outside, the name of bidder, his address, the name of project, and the Contract bid upon.

The Town of Eastchester, Westchester County, New York, reserves the right to reject any or all bids, waive any informalities, or to accept that bid, acceptance of which will, in the judgment of the Town Board, best secure the public interest and efficient work.

No bidder may withdraw his bid within Forty-Five (45) days after the date of opening thereof.

BY ORDER OF THE TOWN BOARD OF
THE TOWN OF EASTCHESTER
Arthur N. Ferris, Town Clerk.

William Raisch
Consulting Engineer
61 Hilton Avenue
Garden City, L. I., N. Y.

DATE, Eastchester, N. Y.
March 15, 1960.

Many contractors depend entirely upon the

OFFICIAL PROPOSAL COLUMNS of Engineering News-Record

for Opportunities to bid. They might not see your announcements if printed elsewhere

◆

You undoubtedly want their bids on your contracts. Make sure of them on your next contract.

◆

The cost is only $2.40 a line per issue.

U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5293) will be received at Collbran, Colorado, until 10 a.m., Mountain Standard Time, April 26, 1960, for furnishing labor and materials for earthwork and structures for Leon Creek and Park Creek Diversion Dams and Leon-Park Feeder Canal, Collbran Project, Colorado. Location east of Collbran, Colorado. Principal items are 372,000 cu. yds. excavation; 28,000 cu. yds. compacting embankments; 1,500 cu. yds. concrete; 2 gates—radial gates and land hoists; 8 gates—cast-iron slide gates and lifts; and other work. Completion time 330 days. For particulars, address Bureau of Reclamation, P. O. Box 396, Collbran, Colorado; P. O. Box 360, Salt Lake City 10, Utah; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5294) will be received at Lewiston, California, until 2 p.m., Pacific Standard Time, May 5, 1960, for furnishing labor and materials for Spring Creek Power Conduit, Tunnels No. 1 and 2 and Rock Creek Siphon, Central Valley Project, Trinity River Division, California. Location near Redding, California, in Shasta County. Principal items are 700,000 cu. yds. excavation; 76,300 cu. yds. concrete; 6,000,000 pounds reinforcement bars; and other work. Completion time 975 days. For particulars, address Bureau of Reclamation, P. O. Box 247, Lewiston, California; P. O. Box 2511, Sacramento, California; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

OFFICIAL PROPOSALS

Bids: April 21, 1960

Electrical Work at the Tuscarora Power Plant, Lewiston, Niagara County, New York

POWER AUTHORITY OF THE STATE OF NEW YORK
ADVERTISEMENT FOR PROPOSALS
SPECIFICATION NO. PA-N-25032
NIAGARA CONTRACT NO. N-27

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for the electrical work at the Tuscarora Power Plant and appurtenant works, located in Lewiston, Niagara County, New York, until 10:30 A.M. Eastern Standard Time on the 21st day of April, 1960, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The work includes but is not limited to the installation of Authority furnished equipment and materials consisting of all generator/motor auxiliaries, main power transformers, isolated phase bus, generator/motor air circuit breakers, secondary unit substations, motor control centers, unit control boards and appurtenances, control batteries and associated equipment, lighting systems, and insulated wire and cable; the furnishing and installing of miscellaneous electrical equipment, conduit and grounding, and cable trays; and making electrical connections to equipment of a basically non-electrical nature such as pumps, air compressors, heating, air conditioning and ventilating fans including electric duct heaters, hoists and elevators, transformer fire protection equipment and other equipment installed or furnished and installed by others.

The work shall be completed on or before June 15, 1963.

Plans, Specifications and Proposal Forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, upon application and prepayment of a fee of Twenty Dollars ($20.00) per initial set of contract documents, and Ten Dollars ($10.00) per set for additional sets, no part of which will be refunded. Plans, Specifications and Proposal Forms for the work will be on file in the Authority's Office and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 per cent of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN
GENERAL MANAGER

PA-N-25032

Bids: April 19, 1960

Nashville Avenue Wharf and Approach Trestles

REVISED ADVERTISEMENT

Board of Commissioners of the Port of New Orleans will open bids at No. 2 Canal Street on Tuesday, April 19, 1960 at 2 o'clock p.m. for the Nashville Avenue Wharf and approach trestles, approximately 60,000 sq. yds. in area of concrete deck on steel bearing piles from Board's stock, grading, foundations for future shed, etc.

Plans, specifications and bid forms may be secured after March 21, 1960 at Room 214 upon deposit of $25.00 by check payable to Board, refundable up to the extent of three sets taken out by anyone submitting a bid directly to the Board. Other sets are available at $25.00 per set, not refundable.

Preliminary plans are available for inspection.

Prior to opening of bids, bidder shall submit evidence that he holds license of proper classification and in full force and effect under La. R.S. 37:2151.

Deposit of 5% of bid, by certified or cashier's check, is required with bid.

Acceptable surety bond for amount of bid is required with notarial contract.

Board may accept or reject any bids, waive informalities and award contract in its best interest.

Req. ENG 3916
March 24, 31, 1960

EMPLOYMENT OPPORTUNITIES

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The advertising rate is $39.20 per inch for all advertising appearing on other than a contract basis. Frequency rates quoted on request.

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Subject to Agency Commission.

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ISSUE
CLOSES
MARCH 28TH

UNDISPLAYED RATE:

$2.40 per line, minimum 3 lines. To figure advance payment count 5 average words as a line.

Position Wanted ads take ½ of above rate.

Box numbers—count as 1 line.

Discount of 10% if full payment is made in advance for 4 consecutive insertions.

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Send NEW Ads and Inquiries to Classified Advertising Division or ENGINEERING NEWS-RECORD, P. O. Box 12, N. Y. 36.

ADDRESS BOX NO. REPLIES TO: Box No.
Classified Adv. Div. of this publication.
Send to office nearest you.
NEW YORK 36: P. O. Box 12
CHICAGO 11: 520 N. Michigan Ave.
SAN FRANCISCO 4: 68 Post St.

• POSITIONS VACANT

Sales Engineer—Civil, Highway product, major corporation, locate one of several points East Coast. Experience in highway construction or with Highway Department desirable. In applying state full qualifications and experience. P-3875, Engineering News-Record.

Prestressed Concrete Sales Engineer: To represent established expanding prestressed concrete plant in Denver, Colorado. Structural design background helpful. Desire top man as first assistant to managing director and capable of full charge. Salary open, profit sharing plan, vacation. Send complete resume. Strictly confidential. Craftsmen Construction Company, 1337 E. 18th Ave., Denver, Colorado.

Opening for Engineering graduate to act as Project Manager, Field Supervisor, Estimator and Man Friday for growing construction company, New York area and East. Write P. O. Box 387, Scarsdale, N. Y.

Estimator—Heavy Construction. Expanding mid-west industrial, institutional commercial firm with nine state operation. Opening for man (25-35) thoroughly experienced in competitive public bidding. Must have take-off, price and sub-contract ability. Send complete resume. All applications held in strict confidence. Our employees know of this ad. P-3938, Engineering News-Record.

General Manager—Civil Engineer. Immediate opening for qualified take-charge applicant in leading commercial and industrial general contractor's organization, located in Arizona. Will be responsible over estimating, bidding, purchasing, subcontracting and organizing projects. State experience, resume, references and salary range. P-3937, Eng. News-Record.

Office-Manager and Controller. Leading south-western U. S. Building Construction Firm has immediate opening for qualified applicant experienced in controllership functions, C P A desirable. Background of General Contracting Accounting Methods very essential. Submit resume, detailing education, experience, references and salary range. P-3944, Engineering News-Record.

Civil Engineer. Once again a leading upstate employer offers a challenging opportunity to assist in a program of engineering personnel selection. The man we seek holds a bachelor's degree in civil engineering and has at least two years of engineering experience or teaching engineering subjects in college, or an equivalent of the above. Beginning salary for this five-day, 37½-hour week is $6410 with guaranteed increases each year. In addition, there are many fringe benefits. We are anxious to fill this vacancy as soon as possible. Personal interviews in Albany, N. Y. and possibly other cities where arrangements can be made. Qualified applicants should send a brief resume to P. O. Box 1624, Albany, N. Y.

Wanted: Structural Designer with approxi-mately 8 years drafting and design experience in reinforced concrete and structural steel frame buildings. For more details send complete resume to Sollitt Construction Company, Inc., 301 Columbia Street, South Bend (24), Indiana.

Sanitary Treatment Engineer—Possibility for department head status with midwest Consulting Engineer. P-4012, Engineering News-Record.

• POSITIONS VACANT

Civil Engineer—Registered Professional En-gineer with experience in municipal street and sewer design. Beginning annual salary approximately $7,744.00. Annual 5% increase each year for next three years to final salary after three (3) years of approximately $8,814.00, with normal fringe benefits. Submit resume and references to Director of Public Service, City of Middletown, Ohio, P. O. Box 530.

Construction Superintendent—Civil Engineer-ing & heavy construction background. General contracting work in western New York. Please send complete resume & salary requirements. P-3964, Engineering News-Record.

Wanted—Project Engineers and Construction Superintendents: Long established midwest general construction firm anticipates openings immediately. Project engineers must be aggressive, tactful, familiar with material controls, owner and architect relations, processing of shop drawings, material samples, change orders, and other details necessary to properly schedule and coordinate material flow to jobsite. Engineering degree preferred but not mandatory. Construction Superintendents must be aggressive, cost conscious, and well experienced in reinforced concrete, structural steel, and masonry structures. Engineering background preferred but not mandatory. Applicants for either position should furnish complete resume of experience and education with salary expected in initial reply. P-3982, Engineering News-Record.

Experienced Draftsman, with minimum of 5 years recent highway drafting experience, for permanent opening in Chicago Office of established consulting firm. Send detailed resume, with salary requirements to P-3945, Engineering News-Record.

Estimators—Have opening for two men, one for General Building Construction and one experienced in Heavy and Industrial Construction. Excellent opportunity for one who can qualify. Must be familiar with takeoff, pricing, purchasing, subcontracts. For more details send complete resume to Sollitt Construction Company, Inc., 301 Columbia Street, South Bend (24), Indiana.

Civil Engineer Graduate with experience in building construction. Permanent position with long established firm in Northern Virginia. Capable of supervising Commercial and Industrial projects with management responsibilities. Send complete resume—salary open—to P-3968, Engineering News-Record.

Sales Engineer—Civil or Architectural with sales experience and potential for general manager duties with franchised, well established Iowa Stran-Steel building company. Attractive salary, company car, expenses and bonus plan. Steel Structures, Inc., Box 5, Sioux City, Iowa.

Wanted—Services of an experienced Public Relations Engineer by a Middlewestern Engineering and Architectural Firm which is 40 years old and busy. The services of this man will be utilized to relieve older Partners of arduous promotion duties. Please write in confidence, listing age, experience, personal characteristics, and compensation desired. Details regarding public relations work on the part of the applicant are essential and should be listed in detail and in confidence. P-3977, Engineering News-Record.

Construction Superintendent for large govern-ment building in Washington. Must have experience on similar projects and thoroughly versed with details. Please send resume of your experience and salary required and how soon available, to P-4025, Engineering News-Record.

• POSITIONS VACANT

Wanted—Top flight young Civil Engineer. One to four years' experience. To join Latin American division of major U. S. firm with permanent production operations in Latin America. Prefer a single man but married persons will be considered. Assignment will involve variety of Civil Engineering and Agricultural Engineering duties. Superb opportunity for experience and rapid advancement. All relocation costs paid. Salary commensurate with experience. Gives complete background and present earnings in first letter. P-3992, Engineering News-Record.

Qualified Civil Engineer to head Engineering Department, Town of Manchester, Connecticut. Salary range $7,152 to $8,517 according to experience. Send for application prior to March 28, 1960 to Chester F. Langtry, Deputy Director of Public Works, 41 Center Street, Manchester, Connecticut. Registration will be required.

Wanted—Sanitary engineer experienced in de-sign of Sewage Treatment Plants. $8000. per year plus overtime and fringe benefits. Wanted—Highway and Bridge design engineers. Experienced. $6500.-$7500. plus overtime and fringe benefits. P-4018, Engineering News-Record.

• POSITION WANTED

Executive-Engineer. Management and Engi-neering experience with top consulting engineering firms. Complete charge of Production Planning and Control, Budgeting, Cost Control and Cost Accounting of private and government contracts. Bachelor and Master Degrees. Registered New York State. Desires position with real challenge. PW-3799, Engineering News-Record.

Construction Sup't., or Projects Mgr. Age 36. 14 years exp., bridge const. From drafting table to general sup't., to ownership of $350,000./year gross business. Presently selling out. Available immediately. PW-3817, Engineering News-Record.

Architects Resident Representative or Build-ing Inspector available. Fair Spanish, French. Write Airmail to: "Engineer" Box 42, Rio Piedras, Puerto Rico.

Project Mgr. or General Superintendent all phases general construction. Not afraid to travel, but would prefer to work out of New England. Sal. Min. $11,000.00 plus bonus & stock options. PW-3828, Engineering News-Record.

Chief Estimator, building and heavy con-struction. Experienced project manager, buyer, expeditor, capable of handling all phases from estimate to closing. PW-3810, Engineering News-Record.

Graduate Engineer-Attorney, 33, married, construction background, knowledge Govt. contracts, seeks position in construction management, will consider anywhere in U.S. PW-3801, Engineering News-Record.

Construction Superintendent. Experienced Hospitals, schools, banks, industrial, commercial buildings and high rise public housing. Quantity take-off, from bidding to final completion. PW-3868, Eng. News-Record.

Grade Supt. Highways. Flood Control, Air Base. Midwest-Eastern or Foreign location O.K. Age 45. P.O. Box 123, Campbell, California.

(Continued on page 338)

EMPLOYMENT PROBLEM?

When you are in need of specialized men for specialized jobs, contact them through an employment ad in this publication.

Exceptional

ENGINEERING OPPORTUNITY

With One of the Nation's Leading Growth Companies

AMERICAN-MARIETTA

A diversified company, American-Marietta has had 46 years of consistent, rapid growth and uninterrupted profitability based on progressive management, a continuous research and development program, and growth products in many fields: adhesives and resins, cement, lime and refractories, construction products, paints and finishes, printing inks, sealants, metallurgy, and environmental and control equipment. Three-quarters of our management group are technically trained.

Excellent position with our Central Engineering group in Chicago is now available for experienced engineer interested in long-range career opportunities, a variety of creative, challenging assignments, and complete responsibility for project development:

FIELD CONSTRUCTION ENGINEER, with ten years experience to be responsible for supervision of plant projects throughout the U. S. and Canada. Extensive knowledge of industrial building construction, especially mechanical and electrical installations, is required.

This position provides attractive starting salary with liberal merit increases based on ability and initiative. A full program of benefits is available, including a company-sponsored educational program.

All replies confidential. Send resume to:

J. R. LYTLE

American-Marietta Company
101 East Ontario Street
Chicago 11, Illinois

ENGINEERS — CIVIL

Resident engineers to supervise construction of long span steel bridges.

Previous experience on similar work. P.E. license in NY State required.

SALARY OPEN

P-3998, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

SALES ENGINEER ARCHITECTURAL REPRESENTATIVE

Zonolite Company is expanding its Building Material Division to assist designers in proper and economical usage of vermiculite fireproofing, insulation acoustics and lightweight concrete. Vigorous research has created new opportunities for recent architectural or engineering graduates for Boston, Washington, D. C., Pittsburgh, upstate New York and Atlanta.

Moderate travel. If you are in your 20's and seeking a promising career in this field,

Send complete resume to Clayford T. Grimm

ZONOLITE COMPANY
135 S. LaSalle, Chicago 3, Illinois
Salary Open

TOP ENGINEER - - SEWERS

Construction firm principally New Jersey requires seasoned engineer for estimating and field, contracts to $10,000,000. Full engineering, executive and job coordination with principals. Supply record. Salary open.

P-3715, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

When Answering BOX NUMBERS . . .

to expedite the handling of your correspondence and avoid confusion, please do not address a single reply to more than one individual box number. Be sure to address separate replies for each advertisement.

ENGINEERS

Chemical Mechanical Instrumentation Relocate to SAN FRANCISCO

Positions exist for experienced engineers capable of assuming supervisory responsibility on design of major petroleum and/or petro-chemical processing units or related projects.

Liberal relocation allowances to San Francisco for you and your family.

Send confidential resume to:
George I. Copeland
Manager of Personnel

Personal interviews will be arranged for qualified candidates.

BECHTEL CORPORATION
220 Montgomery Street
San Francisco, California

WANTED

Experienced dredge superintendent

Must be capable of the operation and maintenance of 18" dredge working in coastal waters Southeastern United States. A thorough knowledge of cost and estimating is essential. Give references, salary desired first letter.

P-3864 Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

STRUCTURAL STEEL PLANT MANAGER

One of Top 10 fabricators of structural steel located in the East. Must have full experience in all phases of production and be able to take over full plant management. We are looking for man interested in permanent situation in highly respected organization. Salary open. Send full resume to:

P-3950, Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

MANUFACTURERS REPRESENTATIVES

To represent manufacturer of well known, high quality, Engineering Instruments.

To contact Engineering, Surveying, Construction and Contracting Firms; State, City and County Highway Departments.

Areas open—Philadelphia—Baltimore—Washington—New England—Minnesota—Iowa—Dakotas—Nebraska—Kansas—Missouri

RW-3955, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

LABORATORY ENGINEER

FOREIGN ASSIGNMENT on Multi-Purpose Dam Project in Thailand

24-Month Contract

College graduate. Should have minimum five years experience in responsible supervisory positions in concrete laboratories including two years in charge of concrete laboratory on dam work. Experience desirable in concrete design, use of water reducing-retarder, air entraining and cooling agents. Must pass physical examination and security investigation.

- EXCELLENT SALARY
- OVERSEAS BONUS
- COMPLETION INCENTIVE
- EXTRA VACATION ALLOWANCE
- MEDICAL CARE & INSURANCE

Send complete resume, include all past employees' addresses and accurate salary information to

SVERDRUP & PARCEL ENGINEERING CO.
915 Olive St., St. Louis 1, Missouri

ENGINEERS AND MATERIALS INSPECTORS

WANTED

TVA has openings on a large hydro- and steam-electric program for experienced civil, structural, electrical, and mechanical engineers in its Division of Design located in Knoxville, Tennessee, and for materials engineers and inspectors of materials located in various district offices, principally in the north and east.

These positions are at the following grades and rates of pay:

Civil, Mechanical, Electrical, and Materials Engineers, grades SD-2 and -3 $6200-$7150.

Inspectors of Materials, grades SE-5 and -6 $5825-$6625.

The engineering jobs require a college degree in engineering or its equivalent with from one to three years of experience in design and specification work, or in inspection and testing work for materials engineers. The inspector of materials jobs require some college training in engineering or equivalent training and experience in making engineering inspection and tests of mechanical structural, and electrical equipment and materials.

All jobs carry automatic within-grade increases for satisfactory service, liberal vacation leave, sick leave, and retirement, hospitalization, and insurance benefits.

Write to:

TENNESSEE VALLEY AUTHORITY
Division of Personnel,
Knoxville, Tennessee

• POSITIONS WANTED

(Continued from page 336)

Elect. Const. Supt. or Ass't. Supt. Overseas. 13 yrs. exp. heavy industrial const. Min. Sal. $12,000 per yr. Contact J. M. McBride, 106 E. Cooke, Glenolden, Pa. LUdlow 6-7131.

Construction Man; Age 35—15 years experience. Supervisory, Heavy and Highway. Resume on request. PW-3867, Engineering News-Record.

Estimator-Superintendent—15 years one Company. Thoroughly qualified to handle complete job bidding stage to completion. Sewage Disposal, Water Treatment, all types Heavy Construction. Will relocate to suit job. Best of references. PW-3913, Engineering News-Record.

Contracts Manager, Project Engineer, Age 41, direct charge of contracts administration, changes, estimating, negotiations and claims settlement. Over 20 years of varied engineering experience with strong mechanical background. Thoroughly competent in office management and field administration. Very good Spanish. Presently located in Europe. Prefer to remain in Europe or relocate in Latin America but open to offer. Available in 90 days. Resume on request. PW-3912, Engineering News-Record.

Highway Construction Superintendent: 20 years experience excavation, grading, etc. Assume full responsibility field and office. PW-3911, Engineering News-Record.

Construction executive C.E. age 37. 12 years experience as civil engineer superintendent, assistant division manager on marine and heavy construction—dredging, pile driving bridge substructures, docks and lock construction including estimating purchasing and cost analysis. PW-3932, Engineering News-Record.

Waterfront—Heavy Construction—Buildings Licensed C.E., over 30 years experience in Design, Estimating, Coordination, Field and Office Supervision. Location immaterial. PW-3933, Engineering News-Record.

California Registered Civil Structural Engineer touring Europe as far as Poland in June will take assignments requiring technical ability and personal representation. PW-3943, Engineering News-Record.

Available Hydraulic Dredge Civil Engineer. Many years experience in field investigation, estimates, consultant. Full time or Project Basis. PW-4024, Eng. News-Record.

Construction Administrator—25 yrs. one large N. Y. Contractor—Registered P.E.-Desire association established engineer consultant or contractor—Northern Jersey preferred but not mandatory—Will invest. PW-3974, Engineering News-Record.

Project Manager, B.S.C.E., 16 yrs. exp. hvy. const., hwys., flood control, earthwork. bldgs., Govt. contracts, field & office, employed. PW-3965, Engineering News-Record.

Executive. C.E. Age 32, 8 years experience heavy, road, pipeline construction, waterworks, plant management, foreign and domestic. PW-4015, Engineering News-Record.

B.S.C.E. Feb., '60, E.I.T. Mo., age 32. Several years experience small fabricator & general contractor. Desire opportunity either field, location open. J. B. Mensch, 704 Maryland, Columbia, Mo.

Engineer (Geol.)—1½ yrs. in superv. of drilling and boring programs, exploration and prop. eval'n. One yr. in general eng. and blasting techs. Age 26 and avail. for travel. PW-4017, Engineering News-Record.

Chicago to Gary area—construction eng. and L.S. desires employment by contractor or land developer. Salary $150 per week. Write P.O. Box 2014, East Chicago, Ind.

Construction Estimator, 20 years experience preparing lump sum competitive bids for commercial, heavy industrial, and institutional buildings, familiar with subcontract negotiation. Age 48, engineering background, now employed, desires permanent connection with general contractor. PW-3970, Engineering News-Record.

Estimator, P.E. 25 years background. Chief Estimator & project manager takeoff Pricing, Purchasing, Sub-contracts, all phases from estimating, Office manager, to closing. Heavy Const. and Architectural. Present yearly volume to Eight Million. Want to relocate. PW-3969, Engineering News-Record.

• POSITIONS WANTED

Engineering Geologist-Soils Engineer, 15 years experience in exploration, foundations and earth structures. Will forward resume on request, presently employed. PW-3975, Engineering News-Record.

Heavy Equipment Master Mechanic, Shop or Field Foreman. Can bring mechanics, operators, welders. Now in Michigan, locate anywhere. PW-3976, Engineering News-Record.

Civil—Sanitary Engineer, 15 years experience in design and construction of sewers and treatment plants desires change, Consultant or Contractor, Prefer Midwest or East location. PW-3991, Engineering News-Record.

Construction Engineer, 27, B.S.C.E., 5 yrs. exp. in commercial and industrial construction as estimator and engineer in charge of field layout. Desire position with contractor or consultant in Southwest. PW-4011, Engineering News-Record.

• POSITIONS WANTED

Construction Engineer—11 years experience heavy construction including industrial and chemical plants and parallel locks. Contracts to $70 million. Experience includes engineering, cost, estimates, procurement, scheduling, subcontracts negotiation and administration, supervision of engineering personnel, administration and organization. Know government contracts. Available soon. Resume on request. PW-4023, Engineering News-Record.

• SELLING OPPORTUNITY WANTED

Sales Engineering Representative available for Connecticut. S.E.M. Associates, 6 West Putnam Ave., Greenwich, Conn.

Sales Engineer: Central Florida resident with own office, averaging one million dollar volume annually in Florida for large miscellaneous iron & steel fabricator, requires to represent in addition, a large structural steel fabricator on a draw against commission basis. RA-3904, Engineering News-Record.

SEARCHLIGHT SECTION

CLASSIFIED ADVERTISING

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The advertising rate is $25.50 per inch for all advertising appearing on other than a contract basis. Contract rates quoted on request.

AN ADVERTISING INCH is measured ⅞ inch vest. on one col., 3 columns—30 in. to a page.

EQUIPMENT WANTED or FOR SALE ADVERTISEMENTS acceptable only in Displayed Style.

UNDISPLAYED RATES

$2.40 a line, min. 3 lines. To figure advance payment count 5 average words as a line.

BOX NUMBERS count as one additional line in undisplayed ads.

DISCOUNT OF 10% if full payment is made in advance for four consecutive insertions of undisplayed ads.

STRUCTURAL ENGINEERING

ARCHITECTURAL ENGINEERING

OUR COURSES of instruction by mail HAVE HELPED THOUSANDS to better positions and to pass State Board Examinations. Forty-eighth year.

[illegible] without obligation

WILSON *Engineering Corp.*

College House Offices HARVARD SQ. CAMBRIDGE, MASS.

ADDRESS BOX NO. REPLIES TO: Box No. Classified Adv. Div. of this publication.

Send to office nearest you.

NEW YORK 36: P. O. Box 12

CHICAGO 11: 520 N. Michigan Ave.

SAN FRANCISCO 4: 68 Post St.

• CONTRACT WORK WANTED

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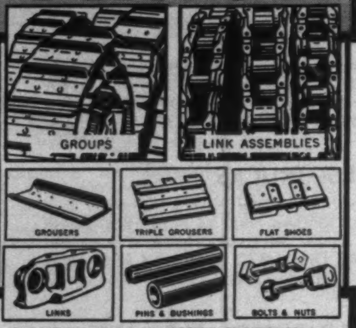

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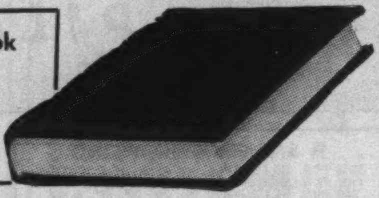

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Editorials

To Raise Research Funds

RESEARCH SPAWNS RESEARCH. The more we learn, the more we become aware of deficiencies in our knowledge, and the more effort we must make to correct them. So when engineering societies meet to report on current progress, as did the American Concrete Institute last week (see p. 61), the additional information that is brought to light only serves to emphasize the need for still more research to insure progress.

A good example of the need for more basic research can be found in the report made by the ACI committee investigating shear and diagonal tension in reinforced concrete beams. Despite all the research carried out in recent years in this field, seeking a better and more precise basis for design, the committee was unable to recommend a design formula for diagonal tension substantially different from the formulas in the ACI building code for the past ten years. These require stirrups for that part of the shear exceeding an amount assumed to be carried by the concrete. Structural failures in the field, as well as laboratory tests, seem to indicate that such design formulas at times do not furnish an adequate safety factor and at other times provide an excessively large one. Yet, in the light of present knowledge, the committee cannot offer a better solution.

Similarly, there is need for more data on high-strength steel reinforcing, thin-web steel girders, orthotropic plate construction, plastic pipe and industrial waste treatment.

Many more examples involving all phases of civil engineering could be cited. They point up the need for greatly increased activity in the field of basic research focused directly on the problems of civil engineering and construction.

The difficulty to be faced, of course, is that of financing. Basic research in civil engineering must usually be a cooperative endeavor. And because the benefits are seldom immediate and applicable to specific corporations, adequate financial backing rarely can be secured. Nevertheless, financing of a cooperative research program would be possible if everyone who makes his living in construction would contribute only a few dollars annually. This perhaps could be brought about if such an agency as a Civil Engineering Research Foundation were to be established to receive and administer the funds.

Such an agency could be set up in a number of ways. One possibility is that the Engineering Foundation might undertake this project. It has operated in the research field for many years. Another possibility is sponsorship by engineering societies, such as the American Society of Civil Engineers or the American Society for Testing Materials.

But however such a research foundation is set up and administered, it does appear to be a vehicle through which the scattered resources of the civil engineering and construction field could be gathered and purposefully channeled. Unless something as far reaching as a Civil Engineering Research Foundation is established, unsolved problems will multiply with a consequent and unwelcome slowing of progress.

A Lesson at Niagara

THE DISPUTE over Indian land for the Niagara Power Project seems to have ended with the least unhappy arrangement possible, considering the strength of feeling generated by the dispute. The New York State Power Authority received access to enough land to develop fully the planned firm generating capacity of the project, and the Tuscaroras will lose only 40% of the tribal land originally sought by the Power Authority.

This case can be used to emphasize the tremendous responsibility of public officials to exercise the right of eminent domain with the greatest possible restraint. In the last analysis this means that planners of projects be sure they develop the design that will require the least possible dislocation of private property rights. Events have shown that this was not done on the Niagara project.

Driven by the need to get on with the job during the two years of litigation, but forced to consider the strong possibility that the Tuscaroras might win, the Power Authority made design changes in the dikes to decrease the reservoir area needed. Not all the planned firm capacity could be developed in this manner, but the reduction was held to a minimum. When the Power Authority finally won the case (ENR Mar. 17, p. 24), work had progressed too far on the redesigned reservoir to permit reversion to the original plan. Using the revised reservoir concept the designers were able to develop the originally planned firm capacity with less than half the Indian land they had first wanted, and without pushing the over-all project cost above the original estimates.

This raises a question—namely: Why wasn't the redesign made before being forced? In fairness to the Power Authority, it should be noted that the agency indicated willingness a year ago to settle for a smaller reservoir, but the wheels of legal procedure were too ponderous to be stopped. The Tuscarora case is now closed and the only thing left in it is a possible lesson:

Deprivation of property under the right of eminent domain is perhaps as close as a democratic society likes to come to subjugating individual preferences to those of the state. Accordingly, it is a public right that should be exercised with the greatest of care and consideration for the dispossessed. The Tuscarora case gives thoughtful pause to all agencies enjoying the right of eminent domain—pause in every case to ponder whether there might be some other way.

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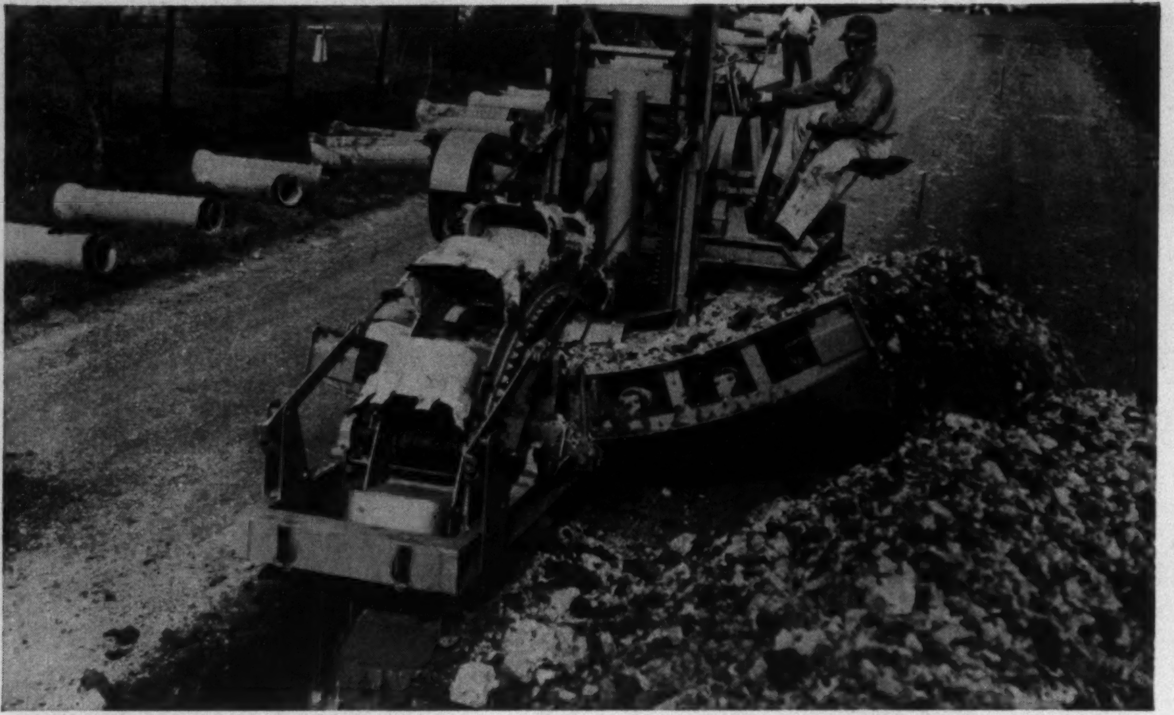

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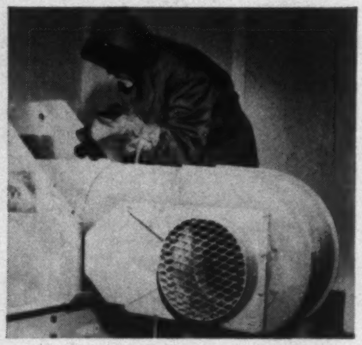

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